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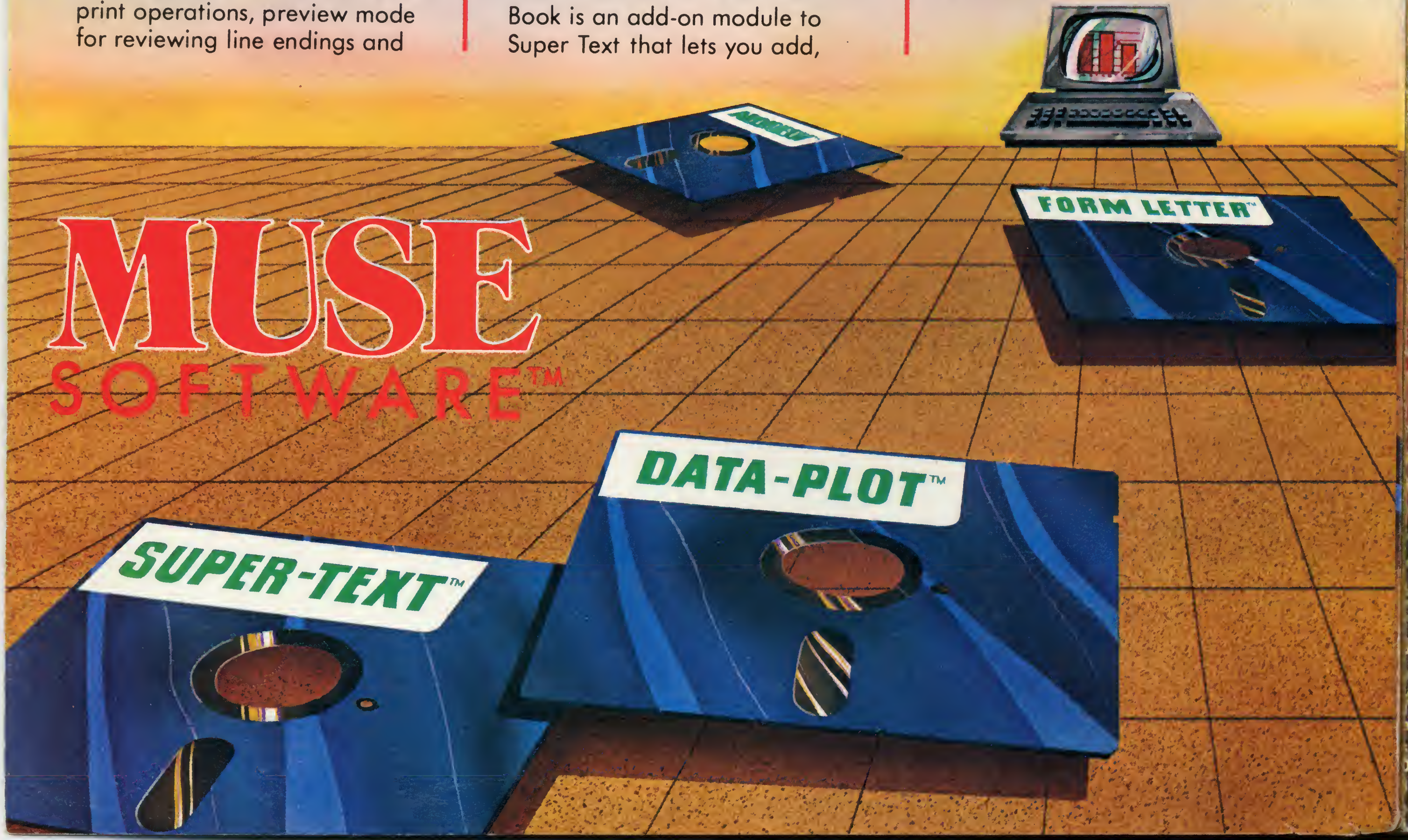

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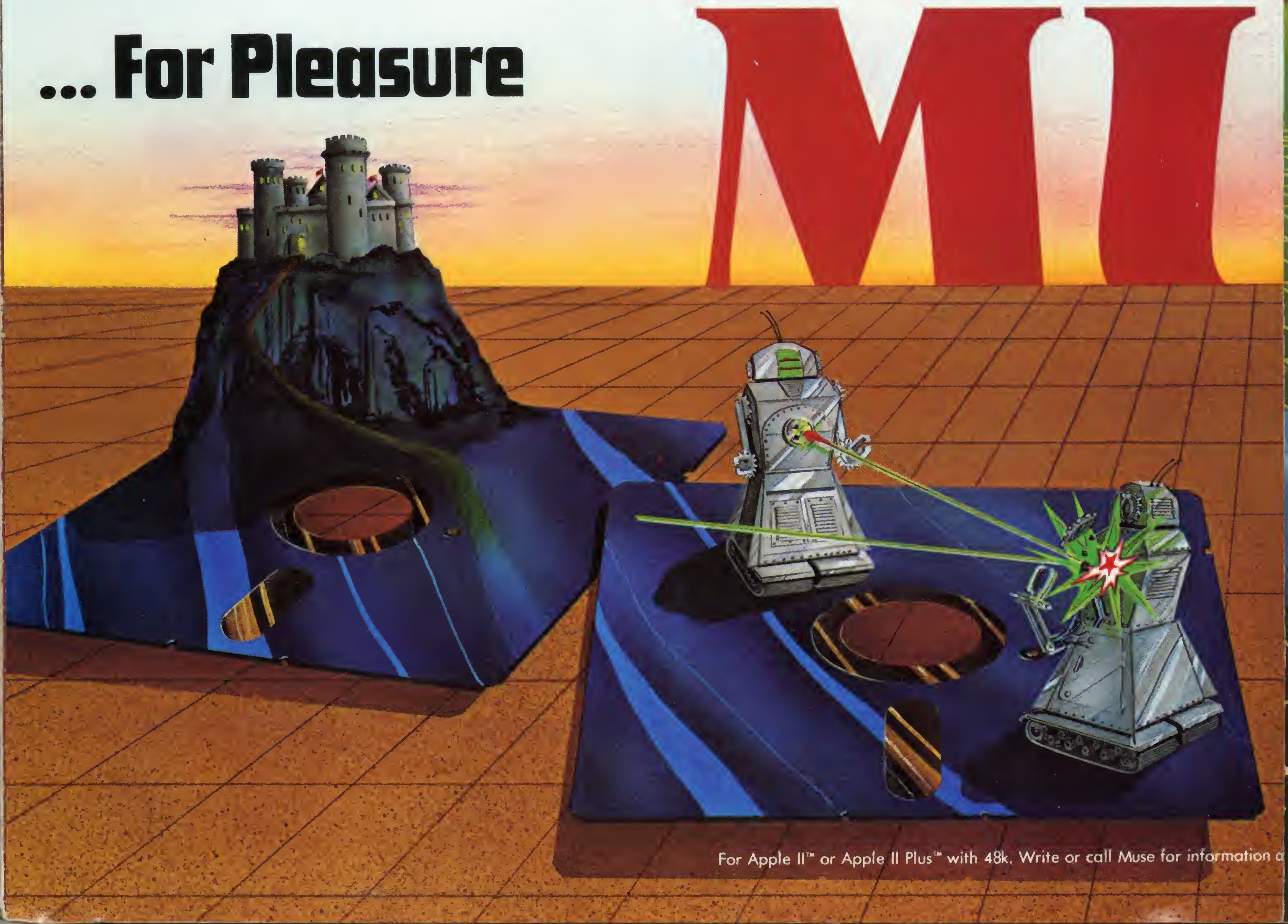

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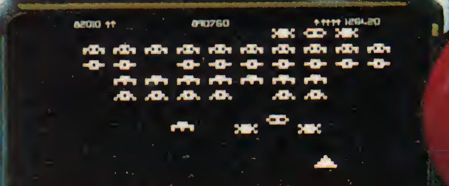

GALAXY INVASION

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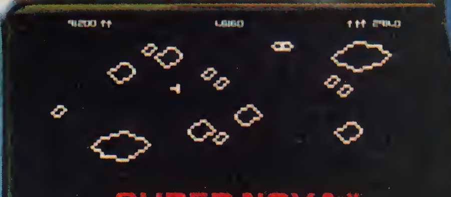

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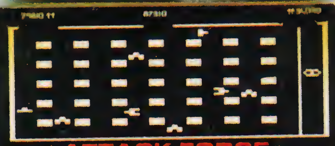

ATTACK FORCE

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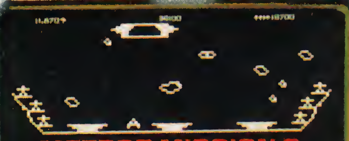

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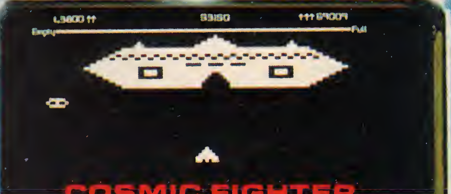

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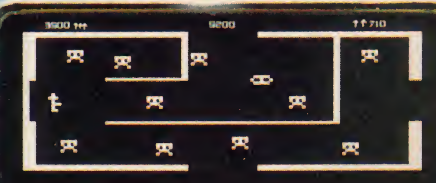

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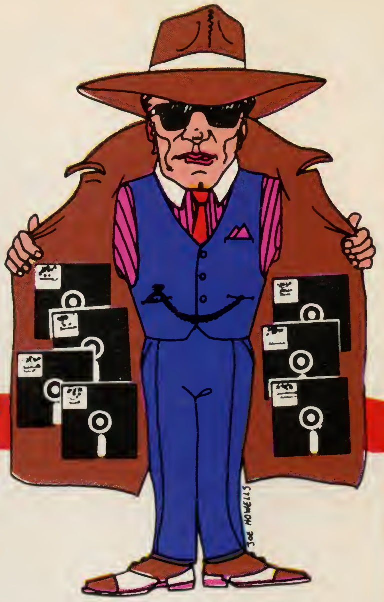

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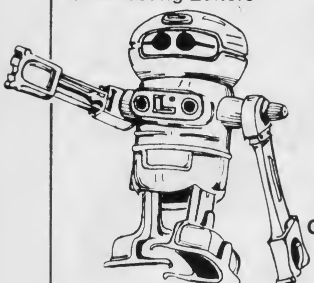

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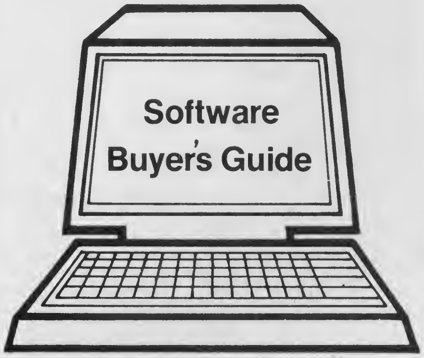

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SOFTWARE PROFILE

Name: IBM EasyWriter
Type: Word Processing System
System: 64K, 80-column display, 1 Disk Drive, IBM DOS
Format: Disk
Language: Machine
Summary: Good individual features but does not live up to its name.
Price: $175
Manufacturer:
Information Unlimited Software, Inc.
281 Arlington Ave.
Berkeley, CA 94707

A normal evaluation of a software product usually reserves judgment, if any, until the end, after the evidence has been presented and the case made. In the case of the *EasyWriter* word processing system for the IBM Personal Computer, most published commentary on the product has been so negative that an author's credibility is jeopardized if the conclusion is not announced early.

EasyWriter is, in fact, a poor product on the IBM Personal Computer. It has been a very popular product for the Apple II, receiving generally favorable reviews from this magazine and others. Que Corporation's *Apple II Word Processing* book contains evaluations of *EasyWriter Professional* and eight other major word processors for the Apple, and *EasyWriter* holds its own. How in the world does a program with a good reputation like that turn so bad when transported to a new machine?

There are two major reasons. The first is simply that there are serious problems with the *EasyWriter* program. The second is more complex, and has to do with the perception of IBM as a company.

IBM certainly means computers to just about everyone, but it means quality as well. The IBM logo on a product, any product, is an endorsement. It means that the product is a quality product, something you can depend on. Your expectations will be high, and they will be higher than *EasyWriter* can meet.

Overall Description

EasyWriter is packaged in the standard IBM way. The manual is supplied in a 9″, three-ring binder with a slipcase. Two copies of the copy-protected program are contained in a plastic sleeve at the end of the manual. A reference card is included.

EasyWriter requires a 64K system, an 80-column display, at least one disk drive, and the IBM Disk Operating System. In order to use the program, IBM DOS must be copied to the diskettes. The manual contains excellent, explicit instructions for this process, and also carefully explains how to prepare data diskettes.

The description of *EasyWriter* is written in tutorial style. Although this is not bad, most things are explained in terms of what they do rather than how they work.

It is possible to use the program after reading the manual, but fluency in anything requires understanding. Experimentation is necessary in order to gain confidence with the system.

The program is loaded by inserting the diskette into drive A and pressing CTRL-ALT-DEL. *EasyWriter* is invoked directly, without the need to issue a DOS command. An introductory screen appears with instructions to insert the desired data diskette in drive A. Once the diskette is in place, the main *EasyWriter* menu, which includes a file directory, appears on the screen. A sample menu is shown in Figure 1a.

The file system supports 31 files of up to 18,500 characters each. Although a DOS disk has a capacity of 160,000, *EasyWriter* has a total capacity of fewer than 116,000 characters.

The file system menu reports on the size of each file, the size of the file in memory, how much space is left for the current file, and the percentage of the disk space which is used. The %USED entry is untrustworthy, but is completely unreliable after a deletion has been made.

The file system menu lists all the commands used for file access and manipulation as well as the "E" command to invoke the editor and the "C" command

---

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GBS can automatically search for, locate, and interrelate information from many files. For example, on each order entry it can automatically decrement inventory; automatically post the data to your Accounts Receivable and automatically update your General Ledger. You don't have to spend countless hours making redundant entires, with the chance for numerous errors. GBS' inter-file relationships and adjustments save you considerable time, and thus many hours of high-cost labor.

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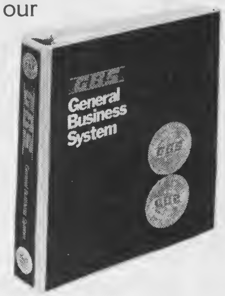

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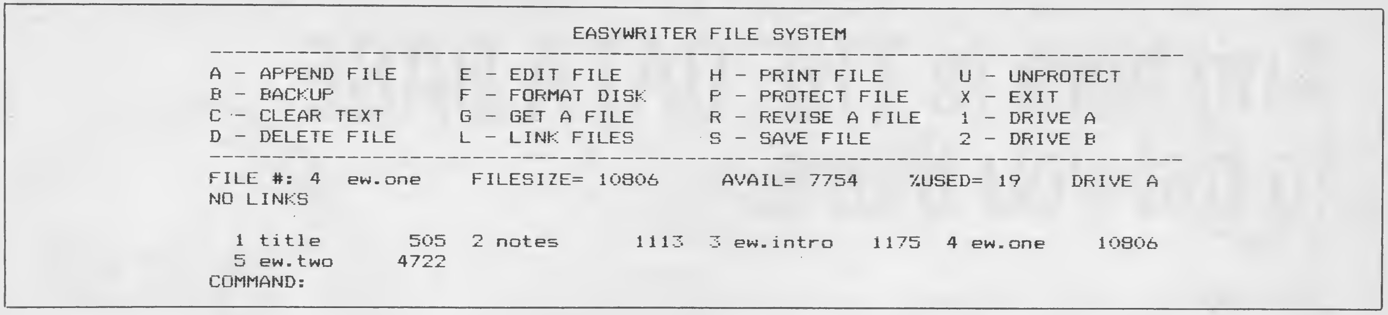
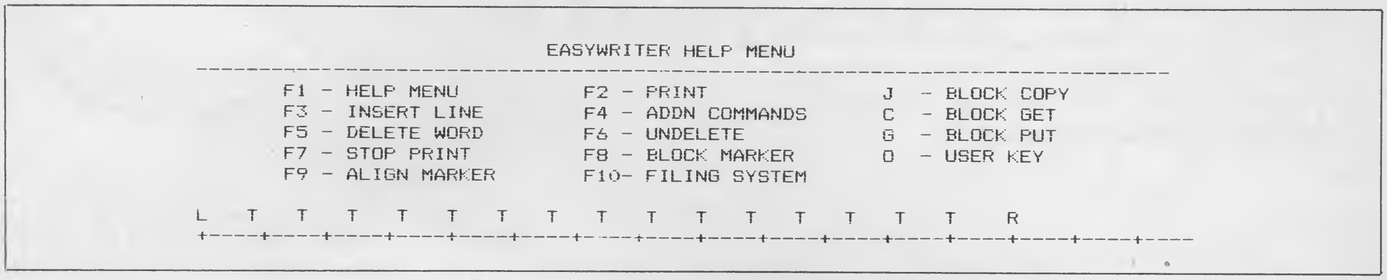
Figure 1a. The File System Menu.



```
                    EASYWRITER FILE SYSTEM
-------------------------------------------------------------------------------
A - APPEND FILE      E - EDIT FILE        H - PRINT FILE       U - UNPROTECT
B - BACKUP           F - FORMAT DISK      P - PROTECT FILE     X - EXIT
C - CLEAR TEXT       G - GET A FILE       R - REVISE A FILE    1 - DRIVE A
D - DELETE FILE      L - LINK FILES       S - SAVE FILE        2 - DRIVE B
-------------------------------------------------------------------------------
FILE #: 4  ew.one    FILESIZE= 10806     AVAIL= 7754    %USED= 19    DRIVE A
NO LINKS

  1 title        505  2 notes       1113  3 ew.intro   1175  4 ew.one     10806
  5 ew.two      4722
COMMAND:
```

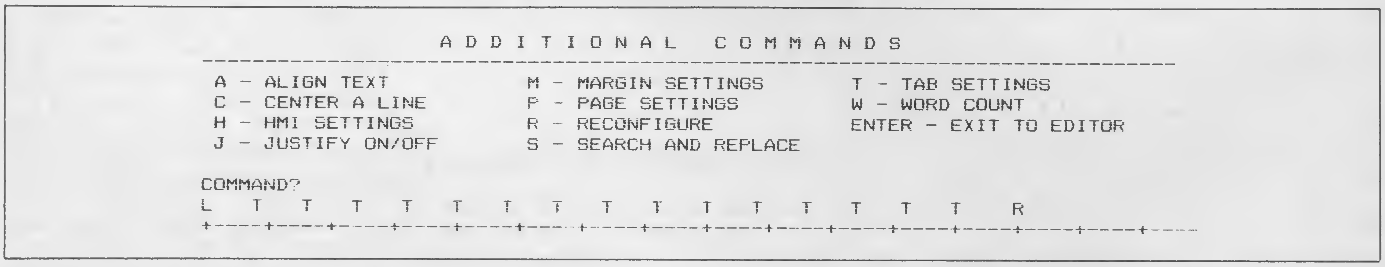
Figure 1b. The Help Menu.



```
                        EASYWRITER HELP MENU
--------------------------------------------------------------------------------
      F1 - HELP MENU           F2 - PRINT               J  - BLOCK COPY
      F3 - INSERT LINE         F4 - ADDN COMMANDS       C  - BLOCK GET
      F5 - DELETE WORD         F6 - UNDELETE            G  - BLOCK PUT
      F7 - STOP PRINT          F8 - BLOCK MARKER        O  - USER KEY
      F9 - ALIGN MARKER        F10- FILING SYSTEM

L   T   T   T   T   T   T   T   T   T   T   T   T   T   T   T    R
+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----
```

Figure 1c. The Additional Commands Menu.



```
                      A D D I T I O N A L   C O M M A N D S
--------------------------------------------------------------------------------
 A - ALIGN TEXT             M - MARGIN SETTINGS          T - TAB SETTINGS
 C - CENTER A LINE          P - PAGE SETTINGS            W - WORD COUNT
 H - HMI SETTINGS           R - RECONFIGURE              ENTER - EXIT TO EDITOR
 J - JUSTIFY ON/OFF         S - SEARCH AND REPLACE

COMMAND?
L   T   T   T   T   T   T   T   T   T   T   T   T   T   T   T    R
+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----
```

to clear the workspace. "E" is the only command needed to begin work on a new document. Existing files must first be loaded into memory with the "G" (get file) command.

For new document entry, the user is greeted by a completely blank screen. This is the first hurdle to overcome when learning to use *EasyWriter:* as in the game of Adventure, you must find the "key" to get back to the file system menu.

Three of the ten function keys on the left side of the keyboard are used for this purpose. F1 causes the "Help" menu to be displayed, as shown in Figure 1b. This menu shows the meaning of all ten function keys, as well as the control (CTRL) keys needed to invoke block operations. A tab setting and margins "ruler" is also displayed. The help menu remains on the screen, and editing of text can continue.

Depressing F1 again removes the menu and restores the screen to a full 25 line text display.

The F4 function key invokes the "Additional Commands" menu, as shown in Figure 1c. These commands are used to align, center, and justify text; to set margin and tab settings; to perform search and replace and word count operations; and to reconfigure the system for different printers. This is also the place from which page numbers are initialized.

Once editing of the text is complete, the F10 function key returns to the File System menu. Using the "R" (revise text) and "S" (save text) commands, the file can be stored on the diskette.

Deficiencies

At first glance, and from the description above, it appears that *EasyWriter* is fully featured and relatively straightforward to use. That's true on a feature-by-feature basis. The system is not well integrated, however. Combinations of features interfere with one another.

Your expectations will be higher than EasyWriter can meet.

As a whole, the system does not have a smooth, easy-to-use operation. Certain features do not work in a manner a user might naturally expect. Worst of all, some of the more desirable "features" of *EasyWriter* require much manual work on the part of the user.

Underlying all these criticisms is the simple fact that *EasyWriter* doesn't remember very much about the document. For example, it appears that the system deals with centering. It is the user who does the work, however.

To center a line, the user places the cursor on the line, goes to the Additional Commands menu, and depresses the "C" key. The display is restored, with the line properly centered. At that point, the line is just another line to the program, in this case a line with some extra blanks before the text.

If the user later decides to change the line, *EasyWriter* does not automatically re-center it: the user must remember to do so. In short, it's the difference between "Take care of centering this line" and "Help me out now, at this instant."

The program is no better at tabs. In fact, while most word processors know how to save tab settings with the file to which they apply, *EasyWriter* stores them with *EasyWriter.* In other words, there is a default setting of tabs which *EasyWriter* remembers, but special settings must be remembered by, again, the poor user.

Manual work is required by the block movement and copy commands. It is not unreasonable to move the cursor to the beginning and end of the block to identify it. Once the operation is complete, however, it is necessary to remove markers from the text, a step which is utterly ridiculous and could be easily handled by the program. Worse, one of the markers

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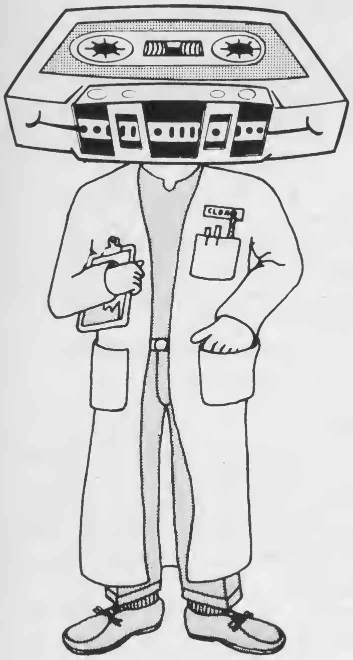

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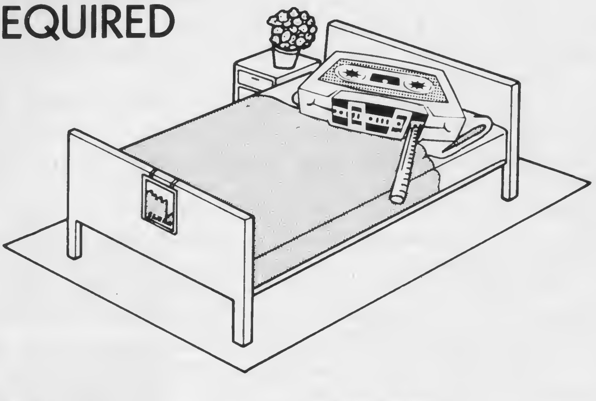

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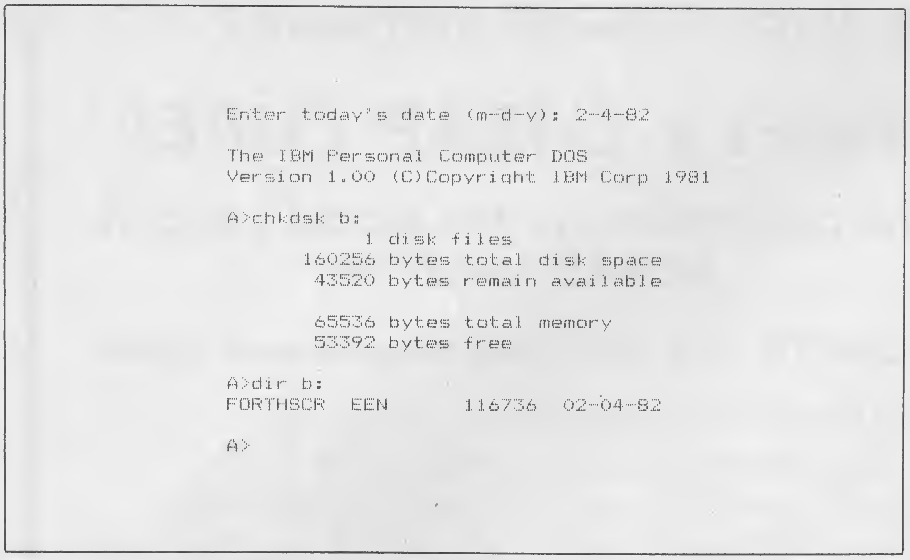

```
Enter today's date (m-d-y): 2-4-82

The IBM Personal Computer DOS
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A>chkdsk b:
           1 disk files
      160256 bytes total disk space
       43520 bytes remain available

       65536 bytes total memory
       53392 bytes free

A>dir b:
FORTHSCR  EEN      116736  02-04-82

A>
```

Figure 2.

usually stays with the main body of the text while the other travels with the block.

Incidentally, this set of commands is not well documented in the manual, and their use is further complicated by their extraordinarily bad names on the Help menu. "J" is called "block copy." J? "C" is "block get" (well, there is a c in block) and "G" is "block put."

Actually, C means "copy the marked text into the copy buffer" and G means "get the text from the copy buffer and put it at the spot where the cursor is now." J is a switch which tells *EasyWriter* whether or not to erase the copy buffer after a G command has been issued. By the way, all the block commands are control keys, that is, the Ctrl key must be held down while the letter key is depressed.

Interference between features is a serious defect in *EasyWriter.* This is most obvious and aggravating with the alignment feature, particularly because it is so vital. *EasyWriter* does not automatically keep the text aligned as the user types. Instead, the user must invoke the "A" command from the Additional Commands menu as required. It is possible to do this only once, after an edit is complete.

However, substantial modifications can result in a very messy document, and it is often desirable to "clean up" frequently as work progresses. The interference comes when alignment is attempted on text which includes alignment protection markers (what?) and when paragraph indentation is in effect.

Because alignment is so important, because *EasyWriter* cannot handle it automatically, and because almost everyone needs to build a table or chart which must not be re-aligned, *EasyWriter* provides a feature known as "alignment protection." The user must mark sections of text which are not to be altered with the above mentioned "alignment protection markers" (henceforth ALM).

This is the most entertaining feature of *EasyWriter* because the ALM is the little smiling face character. The ALMs must be on their own lines, bracketing the protected text. In effect, the ALMs become little paragraphs of their own. And that's the program. The alignment process recognizes the ALMs all right, but it *indents* the starting marker. Not so bad, one might think, until the discovery that *EasyWriter does not* recognize indented ALMs.

EasyWriter does, to its credit, support a variety of printers.

Think about this for a second. Suppose there are two tables to be protected. The first time the text is aligned, everything is fine, but the ALM in front of each table is indented. The second alignment doesn't see these indented markers, so the table is aligned and the text between the end of the first table and the end of the next table is protected. A third alignment indents the final marker, at which point no further protection is possible. Incredible.

There are two generic deficiencies of *EasyWriter.* The first is that the file system is unique. A single large file, inexplicably named "FORTHSCR.EEN," contains the entire set of *EasyWriter* data files. These individual files cannot be accessed by IBM DOS, nor can IBM DOS files be read or written by *EasyWriter.* Some utility programs have emerged that assist with this problem, but the real solution is a word processor that keeps its files as standard, vanilla DOS files.

The second is the performance of the program, which is very, very bad. The two very extreme cases are the use of the Enter key, which ends a paragraph, and insertion mode, which can easily be out-typed by the worst hunt-and-peck typist. I have often filled the keyboard buffer and have been forced to wait for the program to catch up.

Deletions and cursor movement also require some patience. It is hard to believe there is a fast CPU lurking back there somewhere. It is even harder to believe that the program could be so badly written that the inherent power of the IBM Personal Computer is lost.

There are other problems, too many to mention.

Bugs

There are a few bugs. Now bugs — that is, flat-out programming errors — are hard to get out of any program. Most people who have had any association with computers have encountered bugs. The errors in *EasyWriter,* however, are so serious that substantial amounts of work can be lost.

The worst error involves a program "crash," a situation in which the program gets into a state from which it cannot recover. This manifests itself in the total absence of any response from the computer. I have experienced the problem several times, in different ways.

The first was simple: the program stopped running during text entry. The dreaded ALT-CTRL-DEL sequence — dreaded because you know you are losing everything as you do it — was the only recourse.

The second was completely unexpected, and very frustrating. During one attempt to revise a file, the program asked for verification, then asked for the *EasyWriter* program diskette. The text was lost.

A later occurrence of the same problem, but on a diskette which had been modified in an attempt to trap the problem, resulted in DOS rebooting. In other words, yours truly gave the revise command and suddenly found himself facing the DOS prompt. This kind of instability is absolutely unacceptable.

Most other bugs are not as devastating, but are frustrating all the same. For example, often the display during an edit session behaves in strange ways, leaving text on the screen which doesn't belong where it is displayed. I have seen this quite frequently, but seems to be just a display problem, as the text is intact and the display can be recovered. Not serious, but irritating.

Printing

EasyWriter does, to its credit, support a variety of printers. It assumes that the IBM 80 CPS printer (aka Epson MX-80) is

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EasyWriter, continued...

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Unfortunately, the support for the Epson is limited. Underlining is possible but very tedious. Boldface printing can be done easily on a line basis, but considerable effort, including use of the cryptic .USER embedded command, must be expended to print a word or phrase in boldface type. Both of these features, while not simple to program, would greatly enhance the system and the utility of the Epson. If IBM had chosen the MX-80 with the graphics option, these features would have been easy to include.

As if to provide one last and lasting aggravation, *EasyWriter's* control over the Epson is poor. The MX-80 is rather precise for a $500 printer, and can position very accurately to the top of the next page when issued a top-of-form command. *EasyWriter* never seems to issue this command, instead it issues repeated linefeeds to space to the top of page.

After only a few pages, the text starts to "float" downward on the page and soon crosses the page boundary. This is a terrible problem when using continuous paper, but cut sheet paper can be adjusted as each sheet is used.

I have tried two ways to overcome the problem. First, the .FORMSTOP command was used on the assumption that the paper could be adjusted after each page was printed. This worked for a few pages, but suddenly the program did not stop any more, as if it had encountered the .FORMSTOPOFF command. The second try was a .PAGELINES65 command, an attempt to trick *EasyWriter* on the assumption that it was inserting an extra line, thus forcing the downward float. This experiment proved that the error was one-half line per page, as the document instead floated up!

Conclusion

In short, *EasyWriter* is a word processing system with many good individual features, but with very low integrity. The version as released for the IBM Personal Computer has significant programming errors and very poor performance. It is not as easy to use as its name implies. It is not worth its purchase price. Given that several other word processing programs are already available for the IBM Personal Computer, and that many more will be available soon, *EasyWriter* is an unnecessary choice. ☐

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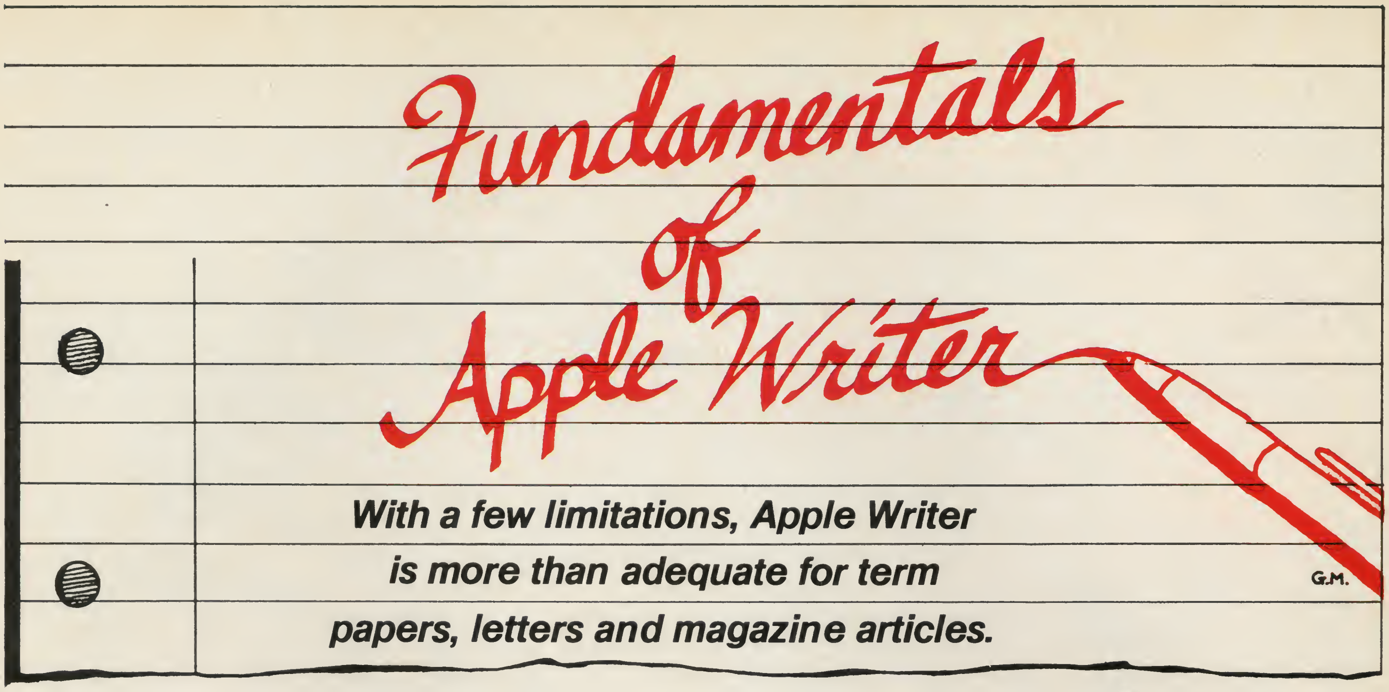
CIRCLE 110 ON READER SERVICE CARD



Fundamentals of Apple Writer

With a few limitations, Apple Writer is more than adequate for term papers, letters and magazine articles.

Barry D. Bayer

First there were cave drawings. And then there was hand carved type. And finally, in 1456, Johann Gutenberg launched development of the technology of moveable type, making the ability to read a perfectly printed page available to the masses.

First there was paper punched tape. And then there were the IBM magnetic tape and magnetic card 'word processors' (the MTST and MTSC). And then, in the last couple of years, the Wang, Xerox, Qyx, Redactron, and all of the other computer technology word-processing systems, which are gradually bringing us into a new era, making the ability to type a perfectly printed page available to the masses.

And indeed the modern "word processor" is one of the hottest items of office technology making the rounds today. But most of the modern word processors are nothing but computers, with software appropriate to the easy manipulation of strings. Given appropriate software the microprocessor can do anything that the big machines can, and considerably cheaper.

Apple Writer comes nicely packaged, with adequate documentation And it works.

creative computing
SOFTWARE PROFILE

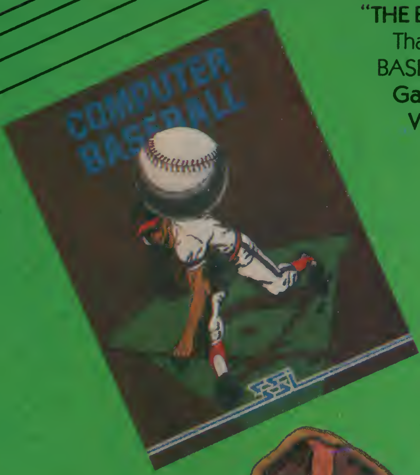
Name: Apple Writer
Type: Word processor
System: 48K Apple II or II+, 1 Disk Drive
Format: Disk
Language: Assembly
Summary: An adequate word processor.
Price: $75
Manufacturer:
Apple Computer, Inc.
10260 Bandley Dr.
Cupertino, CA 95014

Apple Writer comes with several machine language programs duplicated on two 5¼ inch mini-floppy disks, one a write protected systems disk, and the other designed as a working copy. Instructions are given to treat the write-protected disk with great care, as it is intended to be copied when the working disk is worn. (All of the Apple Writer programs are user transferable from disk to disk, and the company even tells us how to do it. It is nice to see a software publisher who trusts us.)

Booting the system with the working disk presents a menu which permits the operator to EDIT a file already in the computer, INITIALIZE a new file, PRINT the file in memory, SAVE the current file to disk, LOAD a file from disk to memory, or QUIT the system and return to Basic. (The actual commands used are, appropriately enough, "E," "N," "P," "S," "L," and "Q.")

Barry D. Bayer, 2842 Walnut, Homewood, IL 60430.

CATCH THE BEST!



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1982
Best Computer Sports Game
video
arcade award

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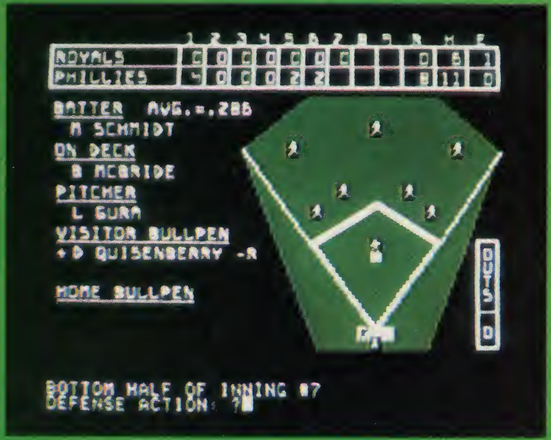

```
           1 2 3 4 5 6 7 8 9  R  H  E
ROYALS     0 0 0 0 0 0 0       0  8  1
PHILLIES   4 0 0 0 2 2         8 11  0
BATTER   AVG.=.288
  M SCHMIDT
ON DECK
  B MCBRIDE
PITCHER
  L GURA
VISITOR BULLPEN
+D QUISENBERRY  -R

HOME BULLPEN
                                    OUTS 0

BOTTOM HALF OF INNING #7
DEFENSE ACTION: ?
```

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CIRCLE 112 ON READER SERVICE CARD

Most people will probably take a quick run through the 7-page manual, and LOAD a "Tutorial" file into memory. Working through the Tutorial program gives one experience in manipulating the cursor to edit text in memory.

The initial Text mode is used to input lowercase text. Pressing the escape key once changes the cursor to an inverse video "^", indicating that the next character typed will be printed in uppercase. (This Upper Case mode effects only the next character typed; a second character will print in lowercase.) As the Apple does not support on-screen lower case, the Apple Writer convention is that all characters appearing upper case on the 40-column screen will print lower case (on a printer that has lower case, of course) and all characters to be printed in upper case are shown on the screen in inverse video. The use of the escape key instead of the shift key, as well as the inverse video, takes some getting used to, but should be no problem to the hobbyist.

Text wraps completely around the screen, going from column 40 on one line, and continuing on column 1 of the next, without requiring a carriage return. This results in strange-looking word breaks on screen, but makes no difference when the text is finally printed.

Pressing the escape key twice in succession changes the cursor to a flashing "+", and, taking a cue from the Apple II Plus, enables the operator to move the cursor about the text using the I,J,K and M keys (they form a diamond on your typewriter keyboard) to move one line up, one space to the left, one space to the right, and one line down, respectively. This Cursor Control mode is used to get to the exact position in the text where you wish to Insert, Delete, or whatever.

The repeat key makes the cursor move faster. Control V (Vertical) to go down about 12 lines, and a control T (Top) to go up about 12 lines make big jumps possible. (The Apple Writer is big on mnemonics. Control B to the BEGINNING, Control E to the END, Control I to INSERT, Control K to KEEP (save) a portion of the file to disk, Control S to SEARCH, and the like. This sounds a bit silly, but it makes the system relatively easy to learn.) Finally, putting the cursor into Cursor Control mode, and a Control Q, will QUIT the Edit routine, and return the program to the main menu.

The Control S search-and-replace feature, although nothing new to computers or word processing, deserves a couple of sentences of its own. When properly instructed, the Apple II will search from the current cursor position to the end of the file for a given string set off by delimiters of your own choosing. Continually pressing Return will get you to each such string found, one at a time. If you have given Apple Writer a replacement string, you can manually order a replacement, one at a time, or can demand the computer replace each instance of the searched for string with the replacement string. Fantastic for semiautomated form letters, and for those of us who always spell a common word the same wrong way, or for changing "Lessee" to "Tenant" all the way through a form lease.

Loading or saving a file involves nothing but typing an "L" or "S", a file name, and pressing Return. To delete a file, or to determine which files are on disk, one types a Control D, which takes you temporarily out of the program, and enables you to access DOS commands, directly. The print option causes another program named "printer" to BRUN, and presents the user with a menu having options of PRINTING a new document, CONTINUING the printing of a document already started, LOADING a file from disk for printing, RETURNing to the Editor, or QUITing the system. ("P," "C," "L," "R" or "Q," of course.)

Apple Writer will certainly make your written communication much clearer and easier.

The new-document option produces yet another menu which permits change of print parameters such as left, right, top and bottom margins, lines per page, spaces between lines, and location of printer-driver routine. The parameters are stored on disk, and will be available, in exactly the altered form, when the new document option is chosen again. The parameter menu then yields to a small menu which gives the user the choice of printing, or pressing escape, which will return to the Print menu for another try. If one chooses Print, the printing will start immediately, unless one has chosen the Single Sheet parameter, in which case the program will stop and allow the user to check paper one last time.

Apple Writer gives the user the additional formatting option of embedding format commands into the text. Each such command must be preceded by a carriage return and a "[". As these commands are part of the text (although, of course, not printed) they may be rather conveniently changed by the Search and Replace routines. These commands take precedence over the values presented in the parameter menu.

Depending on which imbedded commands have been inserted into the text while inputted, and also depending on default values entered in the parameter menu, printing can be justified left, right, centered, or full (simultaneously right and left); spacing can be single, double or more; margins can be varied, and pages numbered and titled. The operator has nothing to do but watch the printer (and feed paper if using single sheet operation.)

Apple Writer, as with all Apple-produced software that I have seen, comes nicely packaged, with adequate documentation. And it works. I suspect that a secretary in a business office might be reluctant to use it, as the inverse video can be confusing to the uninitiated, and one cannot see the typed format on the screen because of the Apple's 40 column display. Each of these are limitations of the computer, however, and not of the software. (There are a number of hardware modifications which provide lowercase characters, and even 80 column lines. The serious user may want to adapt the machine to make it look like a typewriter.)

But for someone who is willing to accept these limitations, the system is more than adequate for light typing such as term papers, complaining letters to software manufacturers, and magazine articles.

Although form letters are not provided for, as such, use of the search-and-replace routines as well as the block-insert and move commands make semi-automated form letters possible.

One disturbing feature of the entire package is the very careful DISCLAIMER OF ALL WARRANTIES AND LIABILITY emblazoned on the Copyright page of the manual. I believe that it is completely irresponsible for a software publisher to attempt to disclaim ALL warranties for a product. At the very least, a purchaser should be able to get his purchase price returned if the product doesn't work as represented in some important respect. (I wish to make clear that the Apple Writer does work, and that Apple is not the only culprit in this regard.) I imagine that Apple would probably do this voluntarily if a disastrous bug was pointed out, but any purchaser should read (and demand to see) any warranty information on any significant purchase, prior to paying, or at least have some sort of understanding with the retailer prior to purchase.

At $75 list price, the Apple Writer isn't fancy. It doesn't have a number of features such as automatic paragraph indentation, multi-file search, underscoring, and on-screen totals. But it will certainly make your written communication much clearer and easier. □

Word Processing: Fast and Easy

Dale Archibald

creative computing
SOFTWARE PROFILE

Name: The Executive Secretary
Type: Word Processor
System: 48K Apple with ROM Applesoft, Disk Drive, lower case adapter or 80 character card
Format: Disk
Language: Applesoft and Machine Language
Summary: Easy to use, ideal for professional writers
Price: $250
Manufacturer: Personal Business Systems, Inc.
4306 Upton Ave. South
Minneapolis, MN 55410

Let me make one thing perfectly clear: this will eventually become a review of a word processing/card file/electronic mail program for the 48K Apple II Plus or Apple II with Applesoft in ROM or a language card. The program will store about 25,000 words on a disk (30,000 on DOS 3.3).

First, however: a recent article on word processing (April, 1981, *Writer's Digest*) really made me sizzle. Writer Robin Perry proclaims "A home computer is a sophisticated toy used for games and such things as budgets, keeping track of stocks, and the like." Perry next grouped the Apple III with the Atari, PET, Heathkit, and the TRS-80 Model II calling them "some of the better-known home computers that have limited word processing capabilities."

In a sidebar, Perry says "...I feel safe in recommending specific machines to you." All of them are between $6,000 and $10,000. The list includes the Apple III, the TRS-80 Model II and the Zenith/Heathkit Z89.

The Executive Secretary is reasonably simple. Considering the options it has, it's amazingly simple.

Further, Perry touts letter-quality printers for $3,000-$4,000 over $1,000 dot-matrix machines. "...the difference in price is worth it."

I emphatically disagree with Robin Perry.

Exhibit A: I am a freelance writer fulltime. Last year I sold over 175 newspaper and magazine articles to a variety of trade and consumer publications, from *Women's Wear Daily* to *Nibble*.

Exhibit B: In my office is an Apple II Plus, 48K single disk drive, MPI 88G dot-matrix printer, and a black and white video monitor. The Apple operates superbly, and has, for the most part, ever since I acquired it about it a year ago. No editor has yet complained of my dot-matrix typeface.

Exhibit C: My total system, with The Executive Secretary word processing system ($250 from Personal Business Systems, Inc., 4306 Upton Ave., So., Minneapolis, MN 55410) cost less than half what Perry recommends. And I love it. Besides, I'd like to see Perry play Starfleet Orion on his/her Olivetti 401.

But it's possible I'm spoiled. This is the only word processing program I've ever used. I feel rather like a race car driver who's putting a test car through its paces: I work it hard in a variety of ways.

Designer John Risken gave me the uncopyable program, and installed the necessary Dan Paymar lower case adapter so that I could try it out and write about it. Bless his soul!

The $250 price tag may seem a bit steep, but consider that this program is a word processor plus form letter generator plus electronic card catalog plus report writer plus electronic mail option all in one.

Understand, please, that I am not a technical person. I am a writer. I don't have time to mess around with anything too complicated. The Executive Secretary is reasonably simple. Considering the options it has, it is amazingly simple.

Unlike some other word processing programs I've looked at for the Apple, The Executive Secretary will operate with the 40-character display and a Paymar chip; or it will use an 80-character board from Bit 3, the Smarterm from Apple, or Videoterm from Videx. The program allows either one disk or two, and can be changed to reflect new purchases.

It will support a variety of printers, parallel or serial, from the Silentype to Qume/Diablo/NEC for bidirectional printing. It will even operate the IBM ET Series typewriters.

There are 76 pages of instructions, 8 1/2 by 11", in a secretary's binder that stands next to the machine. There's also a prompt card that fits across the front of the Apple.

When you first boot The Executive Secretary, the program asks you to answer

---

Dale Archibald, 1817 Third Ave. N., Minneapolis, MN 55405.

some questions. This adjusts it to your equipment.

The Commands

Beginning to type on an Executive Secretary-initialized disk is done just by typing the letter A. In place of the inverse asterisk that signals the editing mode, a short one-character underline appears. On my 40-character screen, the letters appear just as they will on the document: upper and lower case. As you type, of course, the words automatically wrap around to the next line.

Across the top of the screen reads the name of the document you've selected. Under that in inverse letters it proclaims "TYPE!" LEFT ARROW ERASES. 'ESC' ENDS." Hit Escape, and you're in the Edit mode. This allows you to move from line to line, page to page, or front to rear of the document. At the top of the screen, the inverse legend changes to "(A)DD (D)ELETE (M)ARK (P)RINT (ESC)APE."

Simply hitting A shifts you back into the Type mode. The letter D deletes one character or space to the right of the cursor. Shift D deletes a word. Control-D removes the entire line.

The character M marks three or more lines of type to move, delete, or treat as a Subfile. For example, in a lawyer's office there are often entire pages of "boiler-plate"—language that must be put into contracts. Using The Executive Secretary, these could run 3400 words long, yet be inserted just by typing, at the left margin, > sf SUBFILE or whatever name you've assigned.

Also while in the edit mode, it is possible to run a single or double spaced rough draft, line numbered or not, by touching P and answering three questions.

Other edit options include going to the numbered line selected, and a global search and replace.

Hit Escape a second time, and the latest version of your work is saved on disk.

It asks you whether you want to save the new version under the original name, under a new name, or not at all. So typing six letters on the same subject to various people is simple. Just change the addresses and names, then save each version under a new file name. Or you could type > xt NEW PERSON at the address space; as the printer arrives at that spot on the document, it would go to eXTernal file NEW PERSON and insert the correct name and address into the document. (This is for those with only one disk drive. More on this later.)

Printer Commands

The Executive Secretary uses mostly two-letter mnemonics after the right karat (>) to give commands to the printer. (For standard-sized documents, there's a ready-to-go command already set when you want to print.)

But you can customize documents as well. For instance:

- Mark Addresses to print out on envelopes after the letter is printed;
- Advance horizontally and vertically to specified places on pre-printed forms;
- Print documents to allow for bindings, with wider margins on the left side of odd-numbered pages, on the right side of even-numbered ones;
- Set left margin, top margin and bottom margin;
- Run page headers incorporating page numbers, description, etc.;
- Have abbreviations up to a line long, and insert them by typing .TE, for instance;
- Center on and center off;
- Use tabs;
- Indent;
- Have Justification on or turn justification off;
- Change a counter for things like objects or page numbers, where something else might be inserted in a sequence;
- Give special commands tailored to the particular printer, such as subscripts, superscripts, boldface or shadow printing;
- Underline if your printer is capable of doing it.

In fact, Risken seems to be adding new ones constantly.

Electronic Card Files

You can set up files with as many as 13 lines. An empty disk will hold close to 500 of these individualized cards, depending upon whether you use 13 or 16 sector disks. You assign a name to each line you want to use to get up your file. Once your master list is completed, you can sort it in alphabetical or zip code order by any line, rename lines, print mailing labels, even reports doing subtotals and totals.

The Data Factory from Micro Lab will also work with The Executive Secretary.

Form Letters

If you have two disk drives, you can draw information from the card file to print customized letters. There are special commands to the card file that mean certain subfiles will be placed into a document if something is so and something else is so, but not if something else is blank. The program will also change the all-caps structure of the address label into a regular upper and lower case name, if desired.

Visicalc Option

For those who would like to incorporate Personal Software's Visicalc formatted reports into a document, it can be accomplished with The Executive Secretary.

Conclusion

As I say, this is the only word processing system I've ever operated for any length of time. I've used it (and misused it, Risken would swear) practically every day for the last five months in as many ways as I could dream up. I have yet to lose a file of any length, although many of my word changes, line shifts, paragraph moves, etc., have caused words to drop out—as many as three lines. The latest copy of it doesn't seem to be as bad.

It doesn't have a mathematics mode, which at least one word processor does. There is one solder connection to be made for the shift key, which voids the Apple warranty. The photographs showing how this soldering job is done are terrible. And at times, when you have a variety of documents, the printer program must be fiddled with.

Overall, though, those are the only problems I find with The Executive Secretary. It is an example of the quality of the program that I can find so little even to nitpick about. It is a powerful piece of design work that can make life easier for anyone who deals with words. Risken continues to upgrade it, and promises to add further connections to other software from other firms. ☐

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Through the Magic Window

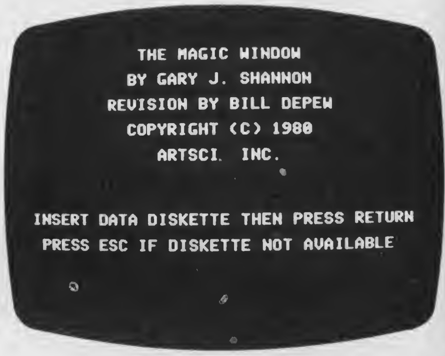
Al Evans

Creative Computing
SOFTWARE PROFILE
Name: Magic Window
Type: Word Processor
System: 48K Apple, Disk
Format: Disk
Language: Machine Language
Summary: Very easy to use
Price: $100
Manufacturer:
Artsci, Inc.
10432 Burbank Blvd.
N. Hollywood, CA 91601

From the simplest to the most sophisticated, any word processing system is basically just an electronic device for making marks on paper. One measurement of the ease of using a word processor is its "transparency"—the similarity between what appears on the screen and what is printed as final copy. From this standpoint, Magic Window, written by Gary Shannon with revision and documentation by Bill Depew, may be the best word processing system available for the standard 40-column Apple II computer.

The "virtuality" (to borrow a term from Ted Nelson) of Magic Window places you behind a window looking at a seemingly gigantic sheet of paper—say 24" by 36". You are at the keyboard of an enormously powerful typewriter, with the ability to deposit any ASCII character anywhere on this sheet in proportionately huge letters. You control the operation through the keys on the keyboard (most of them usable in two different ways), a main control menu, and subsidiary menus used for job formatting, filing, printing, and system configuration.

The Magic Window master disk boots in a single step on any Apple II system—13- or 16-sector. If a language card or compatible RAM card is installed in slot #0, the program will load there, giving the user about 10K of extra text memory. When loading is complete, Magic Window allows you to insert a text disk for automatic system configuration then displays a Subsystem Menu.



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THE MAGIC WINDOW
BY GARY J. SHANNON
REVISION BY BILL DEPEW
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ARTSCI. INC.


INSERT DATA DISKETTE THEN PRESS RETURN
PRESS ESC IF DISKETTE NOT AVAILABLE
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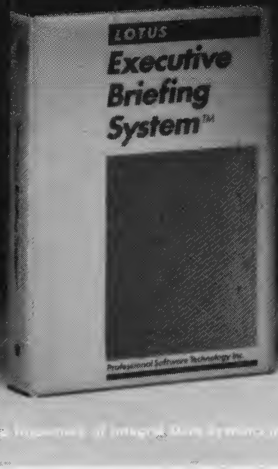
Al Evans, 1206 Karen Ave., Austin, TX 78757.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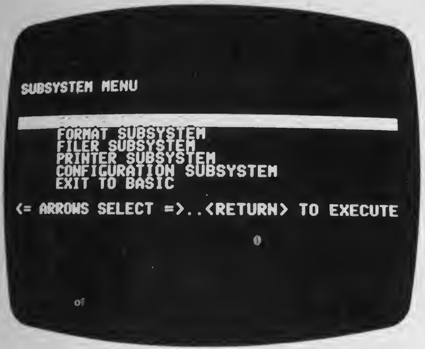
CIRCLE 115 ON READER SERVICE CARD



```
SUBSYSTEM MENU

     FORMAT SUBSYSTEM
     FILER SUBSYSTEM
     PRINTER SUBSYSTEM
     CONFIGURATION SUBSYSTEM
     EXIT TO BASIC
<= ARROWS SELECT =>..<RETURN> TO EXECUTE
```

Magic Window menus are paragons of simplicity: use the arrow keys to move a white bar over the function you want, press Return to execute that function. The Subsystem Menu offers six choices: Editor Subsystem, Format Subsystem, Filer Subsystem, Printer Subsystem, Configuration Subsystem, and Exit to Basic.

The Configuration Subsystem customizes Magic Window for your computer and printer. The system will use a lower-case adapter if you have one (otherwise, capital letters are displayed in inverse characters). You can choose Upper Case Only for editing text files created from Basic programs, etc, or you can select Keypressed Sound for a "tick" each time a key is pressed (this helps establish the "typewriter" illusion).

After your system configuration is defined, it can be stored in a special file on each text disk. It can then be loaded semi-automatically during the startup process as mentioned above.

Using the Program

Now we're ready to follow a typical job through Magic Window, from formatting to printout.

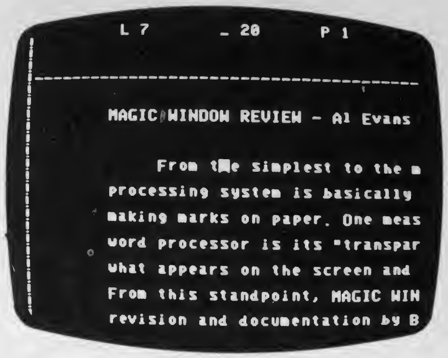
The first step is to select the Format Subsysytem from the Subsystem Menu. This subsystem is used to define the "sheet of paper" you will be using: number of lines, number of characters per line, left and right margins, top and bottom margins, single or double spacing. After a format has been defined it is normally stored on the disk with the text that uses it.

The "sheet of paper" you define can be from one to 84 lines long and from 20 to 85 columns wide. This sheet can hold from one to 84 lines of text, each containing 20 to 80 characters.

After the format is set, Magic Window is ready to accept input. Select the Editor Subsystem from the Subsystem Menu and press Return. You will see one line of data showing the present cursor position on the page (line number and space number) and the number of the present page (relative to the first page of the current text). If you have entered no text, the rest of the screen is blank except for the dashes representing the edges of the "paper" and a blinking underline cursor in the center.

Overall, the text editing facilities of Magic Window are comprehensive, well-designed, and very easy to use.

One unusual feature of Magic Window is that the cursor never moves; it stays right in the middle of the screen. Instead, the "paper" moves under it, just as it does on most typewriters. Any portion of the



```
    L 7        _ 20       P 1
 ----------------------------------------------
        MAGIC WINDOW REVIEW - Al Evans

              From t█e simplest to the m
        processing system is basically
        making marks on paper. One meas
        word processor is its "transpar
        what appears on the screen and
        From this standpoint, MAGIC WIN
        revision and documentation by B
```

"sheet" (within the margins you have set) can be moved under the cursor. The cursor is non-destructive; it can be moved over existing text without erasing it.

Text entry is similar to other word processing systems. A carriage return is required only at the end of a paragraph. If you make a mistake, just backspace and type over it. Tabs can be set and cleared as on a typewriter, with one very handy difference—you can tab either forward or backward.

Editing can be performed any time during or after text entry. The editing commands are all control functions. For example, control-S is "tab right" and control-A is "tab left." The functions are assigned to the keys in logical patterns, rather than mnemonically. For example, control-Q is "up one line," control-W is "up half a screen," and control-E is "top of file." Similarly, control-Z is "down one line," control-X is "down half a screen," and control-C is "bottom of file." A large color chart showing all the editing commands is included with the Magic Window package (Figure 1).

Magic Window uses the so-called "split and glue" approach to editing. The "split" command (control-T) is used to isolate portions of text for alteration or deletion and to open up space for insertions of any length. The "glue" command (control-G)

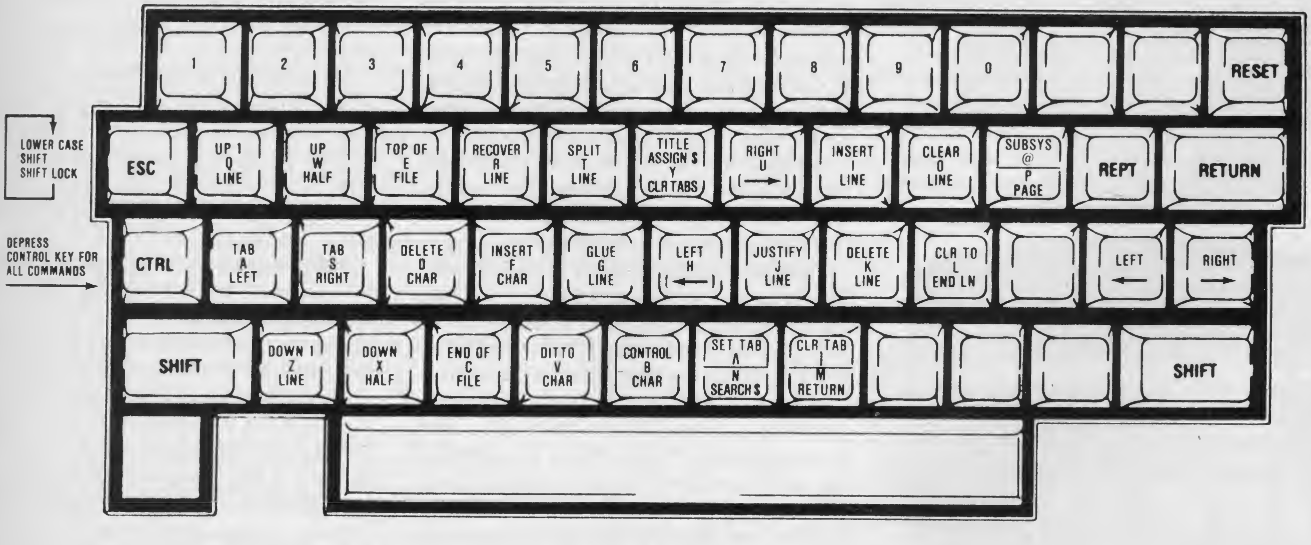

1
2
3
4
5
6
7
8
9
0
RESET
LOWER CASE
SHIFT
SHIFT LOCK
ESC
UP 1 Q LINE
UP W HALF
TOP OF E FILE
RECOVER R LINE
SPLIT T LINE
TITLE ASSIGN $ Y CLR TABS
RIGHT U
INSERT I LINE
CLEAR O LINE
SUBSYS @ P PAGE
REPT
RETURN
DEPRESS CONTROL KEY FOR ALL COMMANDS
CTRL
TAB A LEFT
TAB S RIGHT
DELETE D CHAR
INSERT F CHAR
GLUE G LINE
LEFT H
JUSTIFY J LINE
DELETE K LINE
CLR TO L END LN
LEFT
RIGHT
SHIFT
DOWN 1 Z LINE
DOWN X HALF
END OF C FILE
DITTO V CHAR
CONTROL B CHAR
SET TAB ^ N SEARCH $
CLR TAB] M RETURN
SHIFT

Figure 1. Magic Window editing commands. A large colored chart of these commands is supplied with the system.

is then used to piece the text back together.

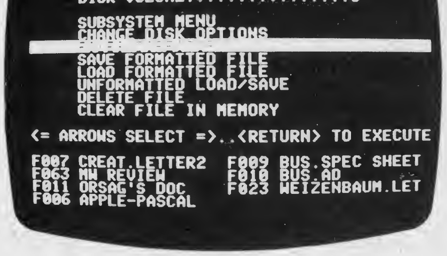
In addition to these functions, the Editor Subsystem has commands for inserting and deleting characters, deleting and recovering lines, copying characters from the line above, clearing the present line, and clearing from the cursor to the end of the present line. There are also commands for setting and clearing tabs, inserting blank lines, and returning to the Subsystem Menu.

Control-B allows you to insert a literal control character into the text. Control-J permits justification (flush left, flush right, flush left and right, center). Each line is adjusted individually, so that you can correct "loose lines" by hyphenating words, etc. In fact, one of the best features of Magic Window is that you can always see where the lines, paragraphs, and pages will end in your file copy.

Finally, the Editor Subsystem has a "miscellaneous" command: Control-Y, which brings up a menu which allows you to clear all tabs, assign a search string for global search, assign a title line (such as a section heading and location for a page number), and switch between two sets of characters not normally available which are assigned to shift-N, shift-M, and the "/" key. These characters include the circumflex, the tilde, the underline, the right and left curly brackets, the right and left square brackets, and the backslash.

Overall, the text editing facilities of Magic Window are comprehensive, well-designed, and very easy to use. Those familiar with other word processors will note the absence of "block move" and "global replace" functions. The system has a "global search," but the "replace" is manual. "Block moves" are accomplished by deleting groups of lines from one place in the text and recovering them in another. There is also a slightly more complicated technique which uses "unformatted" (sequential text) disk files.

When text entry is complete (or, if you're the cautious type and have entered more than you want to lose to sudden power failure), return to the Subsystem Menu and select the Filer Subsystem. This subsystem allows you to load and save two types of disk files (formatted and unformatted), to delete files, look at the directory for the current disk, change drive and slot numbers, and clear the memory for new text.



```
FILER SUBSYSTEM

     DISK SLOT..................6
     DISK DRIVE.................2
     DISK VOLUME................0

     SUBSYSTEM MENU
     CHANGE DISK OPTIONS
     [illegible]
     SAVE FORMATTED FILE
     LOAD FORMATTED FILE
     UNFORMATTED LOAD/SAVE
     DELETE FILE
     CLEAR FILE IN MEMORY

<= ARROWS SELECT =>..<RETURN> TO EXECUTE

F007 CREAT.LETTER2  F009 BUS.SPEC SHEET
F063 MW REVIEW      F010 BUS.AD
F011 ORSAG'S DOC    F023 WEIZENBAUM.LET
F006 APPLE-PASCAL
```

The final step in creating a document with any word processing system is printing. The Printer Subsystem, which is selected from the Subsystem Menu, permits you to print all or any part of your file on either paper or disk.

You can select upper-case-only for printout, specify a stop after each page (for sheet-fed printers), and select Mark Perforation for printing on roll paper which is later to be cut into sheets. This is also where you set the starting page number (page numbers must be in the 0-255 range).

After all the parameters are set, select Print Hardcopy. The system gives you an opportunity to set your paper to the "top-of-form" position. Since you already know what the final copy will look like, the rest is automatic.

The program will load into the Apple language card if you have one, providing more text memory.

Special Features

So what does Magic Window have that other competitive systems (i.e. systems priced under $300) don't have?

In my opinion, the most important feature of this system is that it acts like a typewriter. What you see on the screen is what is finally printed on paper; there are no arcane-looking inverse chracters, lines of numbers separated by commas, flashing brackets, etc. If I were going to train somebody completely ignorant of computer systems to use an Apple word processor, this is the one I would choose. The actions taken are always visible, and operation rapidly becomes second nature.

The "typewriter" illusion is broken only by the use of the Escape key for shifting between lower case and capitals. There are systems in which the shift keys are wired to perform their normal typewriter functions. Unfortunately, this has some drawbacks. First, fewer characters can be accessed from the Apple keyboard if the shift keys are used for upper-lower case shifting. Second, many other systems I often use (for example, the Pascal 1.0 editor with the Paymar lower-case adapter and Bill Blue's ASCII Express) use the Escape key for upper-lower case control, and *any* degree of standardization is welcome. Finally, there is one definite advantage to using the Excape key: lines of mixed caps and numbers can be typed without unshifting for the numbers.

Another major advantage of Magic Window is that it reads and writes files in standard DOS 3.2 format. This means that it interfaces easily with other systems, Basic program, Visicalc, etc. For example, Magic Window comes with a listing of a short Basic program which will read a "softcopy" disk file and send it to a printer. This program can easily be modified to merge two files, for example one containing text and one containing addresses, in order to create customized form letters, etc. Magic Window "softcopy" files can also be uploaded to or downloaded from other computers using standard terminal programs.

The system has several minor, but useful, special features. As mentioned above, the program will load into the Apple language card if you have one, providing more text memory. Printer and interface commands are entered directly into the text as literal control characters, making it easy to use all of your printer's capabilities. In addition, the spaces "between the lines" are manually accessible in the double-spaced format, so that you can "fake" superscripts by placing them between two lines of text. Finally, Magic Window is a turnkey system which will boot in a single step on any Apple I, regardless of configuration.

Shortcomings

So, is this a perfect system? Well, not quite.

For one thing, the disk is "copy-protected." Protecting a disk against copying is inherently a theoretical absurdity. It doesn't hinder the knowledgeable, and causes problems for the inexperienced user, who is most likely to do the wrong thing at the wrong time and wipe out a disk.

However, I should mention that the Magic Window disk is used only once—to load the system. It is never accessed or written to during normal operation, and should therefore be safe unless exposed to stray magnetic fields, excessive heat, etc.

Line length is limited to 80 characters, which could make the system unusable in some applications. There is no way of checking how much memory is availble, but this is no problem after you learn how many pages your system will hold. Finally, there is no automatic way to change formats in the middle of a page, for example to insert a single-spaced quotation in block format within a double-spaced paper. However, this is easily accomplished by means of tab stops and manual linefeeds.

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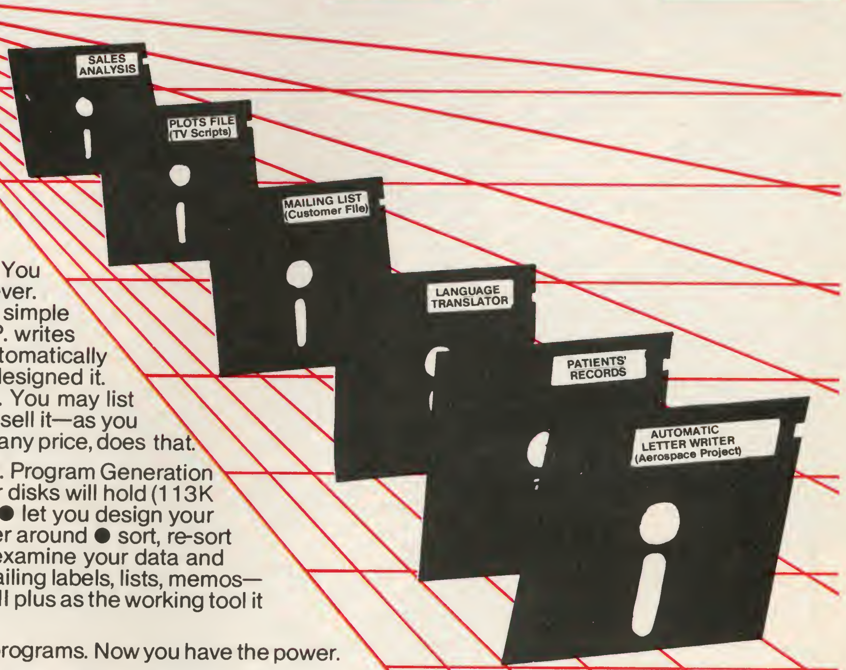

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Window, continued...

Conclusion

When I retired my typewriter, I bought a printer, a lower-case adapter, and a copy of a well-known word processing system for the Apple. The printer and lower-case adapter worked fine. The word-processing system would work for several hours, then wander off into never-never land, leaving pages of text still stored in memory. Although I could find the text in memory and BSAVE it, this system used a non-standard DOS (another "copy-protect" feature), and there was no way to get the text back to the word processor. A week later, I gave up and went shopping. After extensive comparison I bought Magic Window.

Am I satisfied? Well, I've had Magic Window for about four months. In that time I've used it in translating about 400,000 words of French and Italian scientific material and in writing three magazine articles. My income depends primarily on these words, and Magic Window has never lost one of them. Every part of the system always does precisely what the instructions say it will do. Operation is so easy and predictable that my typing speed has increased 40%

In this time, I have also tested several more expensive microcomputer-oriented word processing systems and one "dedicated" word processor. For my purposes, Magic Window compares favorably with the best of them.

I highly recommend Magic Window for any type of document preparation and general sequential textfile handling which requires no more than 80 columns of text.

In brief, Magic Window is a well-designed, well-documented, versatile, and very dependable system. ☐

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The story behind the two best selling computer games books in the world.

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by David H. Ahl

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It Started in 1971

Ten years ago when I was at Digital Equipment Corp. (DEC), we wanted a painless way to show reluctant educators that computers weren't scary or difficult to use. Games and simulations seemed like a good method.

So I put out a call to all our customers to send us their best computer games. The response was overwhelming. I got 21 versions of blackjack, 15 of nim and 12 of battleship.

From this enormous outpouring I selected the 90 best games and added 11 that I had written myself for a total of 101. I edited these into a book called 101 Basic Computer Games which was published by DEC. It still is.

When I left DEC in 1974 I asked for the rights to print the book independently. They agreed as long as the name was changed.

Contents of *Basic Computer Games* (right) and *More Basic Computer Games* (below).

Introduction
The Basic Language
Conversion to Other Basics
Acey Ducey
Amazing
Animal
Awari
Bagels
Banner
Basketball
Batnum
Battle
Blackjack
Bombardment
Bombs Away
Bounce
Bowling
Boxing
Bug
Bullfight
Bullseye
Bunny
Buzzword
Calendar
Change
Checkers
Chemist
Chief
Chomp
Civil War
Combat
Craps
Cube
Depth Charge
Diamond
Dice
Digits
Even Wins
Flip Flop
Football
Fur Trader
Golf
Gomoko
Guess
Gunner
Hammurabi
Hangman
Hello
Hexapawn
Hi-Lo
High I-Q
Hockey
Horserace
Hurkle
Kinema
King
Letter
Life
Life For Two
Literature Quiz
Love
Lunar LEM Rocket
Master Mind
Math Dice
Mugwump
Name
Nicomachus
Nim
Number
One Check
Orbit
Pizza
Poetry
Poker
Queen
Reverse
Rock, Scissors, Paper
Roulette
Russian Roulette
Salvo
Sine Wave
Slalom
Slots
Splat
Stars
Stock Market
Super Star Trek
Synonym
Target
3-D Plot
3-D Tic-Tac-Toe
Tic Tac toe
Tower
Train
Trap
23 Matches
War
Weekday
Word

Artillery-3
Baccarat
Bible Quiz
Big 6
Binary
Blackbox
Bobstones
Bocce
Boga II
Bumbrun
Bridge-It
Camel
Chase
Chuck-A-Luck
Close Encounters
Column
Concentration
Condot
Convoy
Corral
Countdown
Cup
Dealer's Choice
Deepspace
Defuse
Dodgem
Doors
Drag
Dr. Z
Eliza
Father
Flip
Four In A Row
Geowar
Grand Prix
Guess-It
ICBM
Inkblot
Joust
Jumping Balls
Keno
L Game
Life Expectancy
Lissajous
Magic Square
Man-Eating Rabbit
Maneuvers
Mastermind
Masterbagels
Matpuzzle
Maze
Millionaire
Minotaur
Motorcycle Jump
Nomad
Not One
Obstacle
Octrix
Pasart
Pasart 2
Pinball
Rabbit Chase
Roadrace
Rotate
Safe
Scales
Schmoo
Seabattle
Seawar
Shoot
Smash
Strike 9
Tennis
Tickertape
TV Plot
Twonky
Two-to-Ten
UFO
Under & Over
Van Gam
Warfish
Word Search Puzzle
Wumpus 1
Wumpus 2

Converted to Microsoft Basic

The games in the original book were in many different dialects of Basic. So Steve North and I converted all the games to standard Microsoft Basic, expanded the descriptions and published the book under the new name Basic Computer Games.

Over the next three years, people sent in improved versions of many of the games along with scores of new ones. So in 1979, we totally revised and corrected Basic Computer Games and published a completely new companion volume of 84 additional games called More Basic Computer Games. This edition is available in both Microsoft Basic and TRS-80 Basic for owners of the TRS-80 computer.

Today Basic Computer Games is in its fifth printing and More Basic Computer Games is in its second. Combined sales are over one half million copies making them the best selling pair of books in recreational computing by a wide margin. There are many imitators, but all offer a fraction of the number of games and cost far more.

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creative computing

Word Processing with the Radio Shack TRS-80

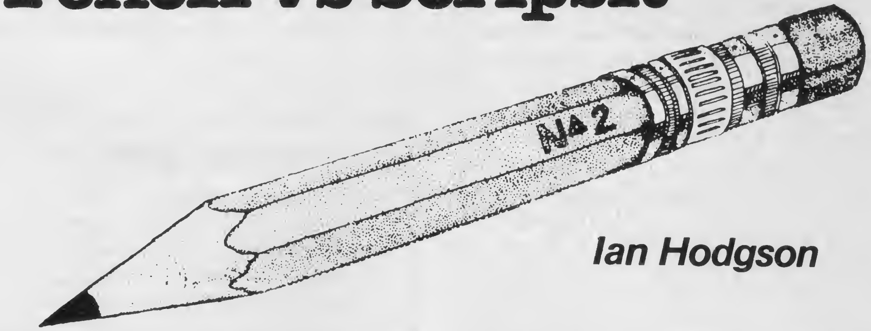
The TRS-80 is a good choice for word processing. It is reasonable in price, has inexpensive, quality service available within a few miles of most of the U.S. population, there are at least three excellent software packages for word processing, and a wide selection of printers can be easily interfaced to the TRS-80.

Creative Computing magazine is produced by TRS-80 computers. We use an interface from Irwin Gretczko (G2 Enterprises, 255 W. 90th Street, New York, NY 10024) to connect a TRS-80 computer to an AlphaComp typesetter. The system also has an Omikron 8" drive system installed. (The interface boards, two 8" drives, CP/M operating system, MBasic, and Phoenix Word Processing system sell as a system for $1700 from Omikron (1127 Hearst Street, Berkeley, CA 94702.) We are able to prepare Electric Pencil files on our CP/M systems or Scripsit and Electric Pencil files on our TRS-80 systems and dump them directly into the typesetter. Nearly every article in the magazine has been prepared this way for the past year.

We are currently installing a micro-Composer interface ($1500 from Cove View Press, Box 637, Garberville, CA 95440) to connect another TRS-80 computer to a Compuwriter typesetter. In addition, we are installing an auto answer modem on another system to allow us to receive ASCII files over the telephone, edit them on the screen, and typeset them all by computer.

In this section, we review Scripsit, Electric Pencil, and Lazy Writer, the best known word processing programs for the Radio Shack computers. We also review two programs that add extra features to Scripsit, Scripmod and Superscript. We conclude the section with the experience of Bill Horvath, a consultant who uses a Radio Shack system for his business correspondence.—George Blank

Pencil vs Scripsit



Ian Hodgson

The combination of the TRS-80 and Electric Pencil has been a very popular one for a couple of years now, and I have been using it for quite a while to produce manuscripts, and tests and reviews for my students. It is so much faster and less frustrating than a typewriter that I didn't begin to notice its shortcomings until recently.

Sometimes, the program bombs in a manner reminiscent of a photon bomb hitting a Klingon ship.

One of Pencil's problems seems well known: that is, its tendency to drop letters when a fast typist reaches the end of a line, and the last word jumps to the beginning of the next. During the jump, the keyboard is ignored, so characters typed are lost. It can be quite frustrating to have to slow down at the end of each line. Some of its other limitations are just as annoying. For instance, if you type a line which has no spaces in it (say you want to underline a long title with dashes, for example), when you reach the 65th character the line will just disappear.

Sometimes, the program bombs in a manner reminiscent of a photon blast hitting a Klingon ship. This problem also occurs if you try to edit a Basic file (from disk) where the lines have been compressed to save time/space. Another limitation appears when you try to use Pencil to set up tables or charts that are more than 64 characters wide. In this case the lines

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Ian Hodgson, 296 Malcolm Circle, Dorval, Que., Canada H9S 1T7.

wrap around, and it is very hard to tell where the columns are. The same limitation makes it hard to tell when a word is going to be at the end of a line, so that you may end up with a number on one line, and its units on the next, and you might get "60" and "mph" on the next. This doesn't cause much trouble in regular text, of course, but in technical writing it is awkward.

Another difficulty arises when you want to indent a block of text, or change printing format during a print run. You can't; at least, not without stopping the printing and resetting parameters. And have you noticed that if you end a paragraph by hitting Enter, just after the last word has wrapped around, the cursor returns to the beginning of the same line rather than the next?

Finally, how many times have you saved a long, long text file and then discovered the next day that you forgot to set the cursor to the beginning before saving and it is all gone?

Now none of these problems is insurmountable; in fact, the whole system is so much easier than a typewriter that I usually sing its praises loudly. But, occasionally, the thought would cross my mind that maybe, just maybe, there was something better. Now just as these thoughts were ripening, I looked through the Radio Shack catalogue, and lo and behold, there was "Word Processor Disk." The very brief blurb seemed to indicate that it would eliminate some of the problems I was having. Not only that, but it was, at $99.95, about $50 less than disk Pencil. But, would it work with lower case? I dropped by the local Radio Shack computer center and looked at the manual. Yes, if you have the offical Radio Shack lower case modification, Scripsit (as the program is called) will handle lower case. Now came the risk. It was going to cost me $100 to see if the official lower case mod was similar to the Pencil mod that so many of us have already done. The answer—YES! My money was not spent in vain. It worked perfectly.

For those of you who don't know about these lower case modifications: the character generator in the TRS-80 has both upper and lower case letters, but to save a bit of money, the folks at Radio Shack left out one memory chip (a 2102) thus leaving only 7 bits rather than 8 for screen memory. Bit 7 is used to indicate graphics mode, so only 6 are left for characters. This is not enough for a full 96-character ASCII set, so they "fake" the missing bit with a couple of gates, and all letters print in upper case. The lower case modification consists of deleting the fake bit and adding an extra memory chip, thus allowing a full character set to be displayed.

It takes a while to learn how to use Scripsit. In fact, the program comes with a set of six one-hour lessons on audio cassette, and the manual is designed around these lessons. This does make the manual a bit cumbersome for those of us who try to look things up without taking the self-teaching course, but there is a summary at the back which answers most questions.

The entire screen scrolls to the left, and continues doing so until you reach the end of the defined line.

Scripsit also comes with a set of stick-on labels for your keyboard, which make it much easier to remember what all the control keys are, and a quick reference list of all instructions. But let's find out what the program does. I will concentrate mostly on those characteristics which differ from Electric Pencil, but a more complete list of Scripsit functions is given in Figure 1.

The first thing I tried was to type at about 100 wpm and see how many letters were missed on wrap around. None! True, the last word did disappear for a second or so, but when it came back all the letters I had typed were there. Score one for Scripsit.

Then I wanted to see what horizontal scrolling was all about. In Scripsit you can define the screen width to be anything you want up to 132 characters. It is usually advantageous to set it the same as your printer width, if you are typing anything that needs special formatting. When you reach the end of the 64-character video line while typing, the entire screen scrolls to the left, and continues doing so until you reach the end of the defined line, at which point it jumps back to the right again. (Score one more—when you get to the end of a line with no spaces, Scripsit just continues on the next line.) So when you set up tables or exam questions, or want to see which word is at the end of a line, you can see just what you will get.

There is a WINDOW command which allows you to move the screen in any direction without typing characters. As a further aid in setting up columns, you can set tabs in as many positions as you want, and the tab locations are visible as dots in a solid line that run across the bottom of the screen.

Figure 1. Scripsit commands.

COMMAND GROUPS

Cursor motions:	left
	right
	up
	down
	end of file
	top of display
Terminations:	end of line
	end of paragraph
	end of page
Deletions:	character
	word
	line
	blanks
	paragraph
	block
	unmark block
	to end of text
Insertions:	character
	line
Exchanges:	words
	paragraphs
	blocks
Labelling:	open block
	close block
Information:	cursor line #?
	length of document?
	memory left?
Printing:	Print
	Print to serial port
	Print with page pauses
	Print "invisible"

OTHER COMMANDS

Set video width
Set paragraph indent
Tab set
Upper case lock
Window up
Window down
Window left
Window right
Global replace
Global delete
Global search
Repeat (works with all commands)
>*comment line
define header block
define footer block
define page # block
define hyphen block
define block
end block
remove hyphens
save to disk
save to tape
save in ASCII form
load from disk
load from tape
load and append

The screen width command is also used for hyphenation. This command allows you to determine the best place to hyphenate words to tighten up lines. It is not a fully automatic system with memory tables, like some, but simply stops at each potential word and allows you to decide. To use the command you simply define the screen width to be the same as your printer width, define the block you want hyphenated, and enter the H command. The cursor will stop at the first appropriate word. You may hit "-" to insert a hyphen, left arrow and then "-" to insert one earlier in the word, or "enter" to leave it alone. The cursor will proceed from word to word until the block is finished. These hyphens are stored with bit 7 set so that they can later be recognized and deleted if you want to change the print width.

Another major advantage of Scripsit over Electric Pencil is that all output formatting is controlled by commands embedded in the text. Each such command line is preceded by a > sign, which must be the first character on the line. This means that you can change format as many times as you want during a printout. The format commands are listed in Figure 2. A sample text file with commands is shown in Figure 3a, while the resulting printout is shown in Figure 3b. Important improvements over Pencil include vertical centering (good for writing letters), paragraph spacing (which can differ from line spacing), flush right mode (also called ragged left), automatic horizontal centering (good for title pages) and "window suppress." This last command forces the printer to a new page if the last line on the previous page would start a new paragraph.

Figure 2. Scripsit page formatting commands.

Set page length
Set right margin
Set bottom margin
Justify text paragraphs
Center text
Center vertically
Enable printing
Begin header on page...
Turn on/off header
Beginning page number

Set left margin
Set top margin
Set line spacing
Set # lines between
Print flush right
Suppress printing
Widow suppress
Begin footer on page...
Turn on/off footer

Figure 3a.

```
>*COMMENT LINES CAN BE INCLUDED IN THE FILE, and they_
>*don't print in the final copy._
>VC=N_
SCRIPSIT allows you to change print format by imbedding
commands in the text. The default format has a left margin
of 12, right margin of 72, and is justified and vertically
centered. This paragraph is printed in the default format,
although it is not vertically centered._

_
>C=N J=Y LM=25 RM=59_
Long quotes are often inset from the body of a report as
shown in this example. Many text editors make it possible
to do this easily._

_
>J=N LM=12 RM=72_
Another format is "ragged right" (or flush left). Justifi-
cation is turned off, and, if desired, the lines can be
evened out by hyphenating words. This paragraph is printed
in the ragged right mode._

_
>FR=Y_
     Flush right (sometimes called ragged left) is another
print mode available on SCRIPSIT. It is most often used for
page headers or sometimes for labelling diagrams. Text
printed this way looks a bit unusual, but could be used for
decorative purposes._

_
>FR=N C=Y_
Centered text is useful for page numbering,_
title pages, and similar uses. It is not justified.
Justified centered text can be_
accomplished by setting appropriate left and right margins.
Notice that all_
of these changes, and many more, can be set during printing
by means of imbedded commands._

_
```

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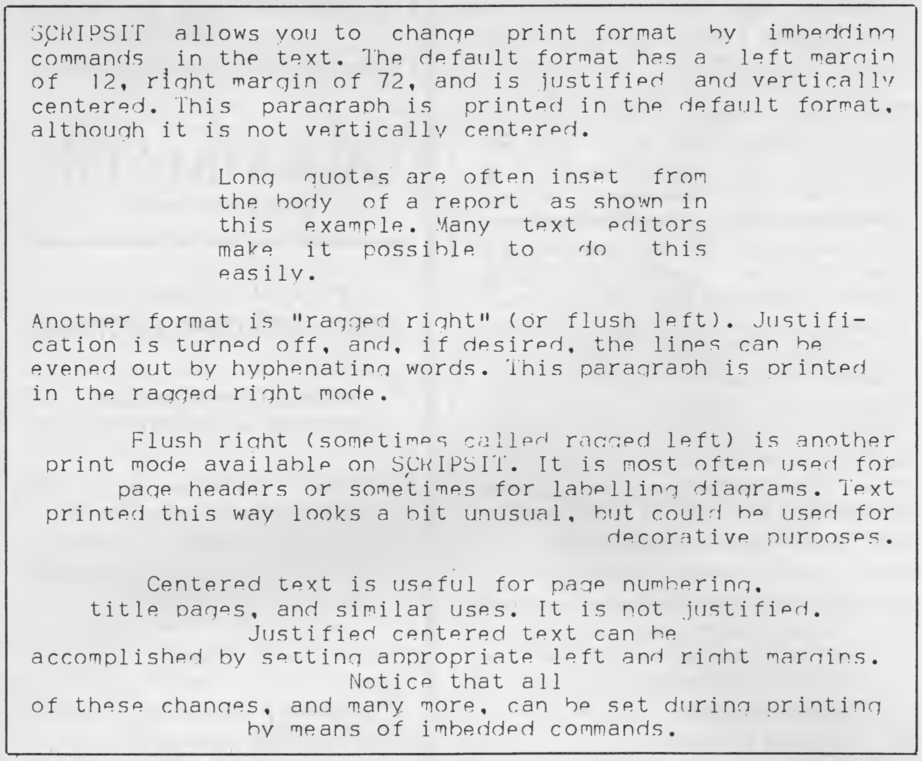

```
SCRIPSIT  allows you to  change  print format  by  imbedding
commands  in the text. The default format has a  left margin
of  12, right margin of 72, and is justified  and vertically
centered. This  paragraph is  printed in the default format,
although it is not vertically centered.

                Long  quotes are often inset  from
                the body  of a report  as shown in
                this  example. Many  text  editors
                make  it  possible  to   do   this
                easily.

Another format is "ragged right" (or flush left). Justifi-
cation is turned off, and, if desired, the lines can be
evened out by hyphenating words. This paragraph is printed
in the ragged right mode.

        Flush right (sometimes called ragged left) is another
  print mode available on SCRIPSIT. It is most often used for
       page headers or sometimes for labelling diagrams. Text
  printed this way looks a bit unusual, but could be used for
                                          decorative purposes.

           Centered text is useful for page numbering,
      title pages, and similar uses. It is not justified.
               Justified centered text can be
accomplished by setting appropriate left and right margins.
                          Notice that all
of these changes, and many more, can be set during printing
                  by means of imbedded commands.
```

Figure 3b.

Putting >* at the beginning of a line allows you to insert comments (which will not be printed) in the text.

Scripsit allows more flexible page titling than Pencil. In Pencil, you may use one line (less ten spaces for the page number) for a title which will appear at the top of each page, followed by the page number at the top right corner. Scripsit lets you have multiline (up to 16) headers and/or footers, and the page number can be anywhere you want at the top or bottom of each page. You can also format the page number, so you could have "PAGE 3," "page 3," "p. 3," or even "This is page 3" if you wish. The headers and/or footers may be on every page, on even pages, or on odd pages, and you can have a different header on even and odd pages, so that you could have, say, the chapter number on the right-hand pages and the topic on the left-hand ones, with the page numbers on every page. Footnotes can be done in Scripsit, but not easily, as it does not have specific provision for them. Headers and footers can be turned on and off or changed at will anywhere within the text.

Entering text in Scripsit is very much the same as in Pencil, but whereas Pencil zeroes all of RAM for a buffer before you start, Scripsit does not. In fact, Scripsit starts you off with 60 blanks (spaces) in the text buffer and you type over them. When you use them up it gives you 60 more, and so on (the letter you are typing disappears for a tiny fraction of a second while this happens, but you don't lose it). You cannot advance the cursor past the buffer area. This leads to one slight inconvenience. If you have a terminated line, such as one ending with ENTER at the end of a paragraph, you cannot move the cursor past the end of that line unless you use the "insert line" command to put 60 blanks there. In fact, there is no multiple-insert mode as there is in Pencil, so to insert a word you press "insert line," then type in the word, then hit CLEAR to eliminate the excess blanks. It sounds a bit inconvenient, but you rapidly get used to it, and the insert mode in Pencil is not much better, especially if you are inserting at the beginning of a long file, in which case the entire file moves after each letter and insertions are painfully slow. In both editors, after you finish inserting the first line, more space automatically opens up one line at a time.

In Pencil you can define a block of text and then delete it or move it to another location. This allows you to rearrange the order of what you are writing and makes short work of editing. Scripsit allows you to do this with multiple blocks, as each is identified by means of a letter. There is also an "exchange block" command which is very useful.

Scripsit also allows you to exchange paragraphs or words. The procedure is the same in each case: simply place the cursor anywhere in the second paragraph (or word) and hit "exchange paragraph" (or "exchange word") and the job is done. This allows easy tidying of sentences that might read better if the words were reordered.

The Electric Pencil supports two printer drivers. If a line printer is connected to the parallel port, it will be driven more or less normally. I say "more or less" because Pencil supplies line feeds after carriage returns and the Radio Shack line printers will double space in this mode, which is fine if you want double spacing, but Pencil will then give you pages twice as long as normal too. There is a special command (SX) to fix this, but it allows single-spacing only, and requires reloading of Pencil to change once it is set. (Pencil seems really to be set up to use the TRS-232 interface, which does software timing and outputs 300 baud ASCII via the cassette port. It will automatically switch to this mode if there is no line printer.

There are three print commands in Scripsit. "P" will send output to the line printer, in completely Centronics (i.e. Radio Shack) compatible form. "P,S" will send the output to the RS-232 port on the expansion interface. Adding the ",I" suffix to either of these will print the entire file, including formatting commands and comments. Unfortunately, Scripsit assumes that your serial printer supplies its own line feeds. Mine doesn't, and using double-line spacing to overcome the problem gives you pages half the normal length; just the reverse of Pencil's problem. Score -1 for Scripsit.

On the plus side, though, if you want to use single sheets of paper (for example, letterhead) in your printer, adding a ",P" suffix to any of the print commands will cause output to stop at the end of each page while you put in a new sheet. One nice feature is that Scripsit always scans the "clear" key, which is used to abort commands in progress. This key is even scanned during printing, while the program waits for the line printer "busy" line to clear, so you can regain control even if your printer stops, runs out of paper or is unselected. Normally this would require rebooting and would imply loss of your file. (This is what happens with Pencil.)

When you load a file the first time from disk, Scripsit remembers its filespec and drive number until it is changed. Saving the modifed file is just a matter of typing "break" then "S". Scripsit will even remember the drive number on which it found the file if you didn't specify it, and append that number to the filespec so that when you save the file again it will be saved on the diskette from which it originally came. The cursor does not have to be moved to the beginning of the file! It quickly becomes a habit to type "break S" every few minutes to back up the file onto disk in case of power failure or what have you. Similarly, if you have botched the file since last loading it, "break L" will reload the original. The current file name can be ascertained with the "break ?N" command. Commands for saving to and loading from cassette are also included.

Although there are ways to do it, Pencil

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is hard to use with Basic files. If you try to load a Basic program or data file into Pencil it doesn't load, and DOS ERROR 22 appears. (The Pencil fix included with the VTOS operating system overcomes this problem, and also allows Pencil to operate with NewDOS, which it doesn't normally do either). The problem of lines longer than 64 characters without a space still remains even if you do get the file loaded, though. On the other hand, Scripsit operates perfectly with Basic program and data files (except that I haven't found a way of entering an up-arrow for exponentiation) or any other ASCII files. There is even a special ASCII save command in Scripsit so that Basic-compatible files will be produced. This is necessary because all command characters (such as paragraph ends, etc.) are normally stored in Scripsit files with bit 7 set, which would cause confusion since Basic would be looking for hex OD to terminate lines and would see hex 8D instead. In the ASCII mode, bit 7 is not set. When you load an ASCII file into Scripsit it will determine the control characters from the context, and set bit 7. (Scripsit did not originally work properly with NewDOS, failing to load the last record of a file, but patches to Scripsit are now supplied with NewDOS 80.)

Scripsit operates perfectly with Basic program and data files.

Incidentally, Scripsit works fine with Pencil files, although you will have to add the formatting commands. And the VTOS-fixed Pencil works on Scripsit files too, within its limitations.

Well, I seem to be running the risk of writing an instruction manual here, so I guess I'll call it quits. Which one should you use? If you have both you may find Pencil fine for short jobs—say, typing a quick letter—and, of course, it lets you use the TRS-232 interface. It also allows you a bit more freedom in moving the cursor around to insert text past the end of a line. But, for those of you with no editor yet, I can only see one reason for buying Electric Pencil: it is a smaller program (6K or so compared to 10K) and allows you more text space (4K is about one single-spaced typewritten page). This is no problem at all on a 48K system, but is worth considering if you only have 32K. Pencil has several bugs, doesn't do half of what Scripsit does, and costs 50% more. With Radio Shack software often rumored to be, it comes as a pleasant surprise to find a dynamite text editor for a modest price right in their catalogue. ☐

Thoughts on Scripsit

The following is part of a letter sent to John I. Snodgrass, Jr., manager of Radio Shack Computer Services, by Peter J. Brennan, Worldtech, P.O. Box 834, Gracie Station, New York, NY 10028.

I find that I can type a great deal faster with Scripsit than Pencil. It does not drop characters at the beginning of the line and does not have any keybounce whatever, which in Pencil is a big problem for two-fingered typists like myself. The hypenation feature is useful though cumbersome. Other features that undoubtedly make the program very versatile also make it far more difficult to learn to use than Pencil. Formatting is driving me up the wall. Indeed, I have made some standard formats and saved them on disk. When I want to type, I load in the format, change the date on the header and start typing.

There are some problems and also some features lacking that I would like to see added:

1)?M gives me 32,608 characters free on start-up of my 48K two-drive system. The manual says the maximum figure, which I think I have, should be 36,909. That's quite a difference and one that matters to me since my standard manuscript will not fit entirely in memory with Scripsit but fits fine in Pencil. I wish I understood the difference.

2) I have an Anderson-Jacobson AJ-841 parallel printer, which, as you know, has Z-80-based electronics and an IBM Selectric front end. It runs beautifully with the TRS-80, or has. It doesn't run very well with Scripsit. Apparently it drops the first line feed after carriage-return-with-line-feed. LS=2 gives single spacing but the computer counts double so the page ends in the middle of the sheet. To make one blank line, one must make two line delimiters. LS=3 gives double spacing but also a miscount that ends the page far up the sheet. With a long manuscript that I had to get out in acceptable form, I was tearing my hair out. I finally set page length at 35 and set the printer mechanically to double space. It worked but is not an acceptable long-term solution. Single-space works fine.

3) I can build and save a much larger text than I can load back into the machine from disk. It saves fine, but then "L" gives me "NO MORE ROOM." Fortunately, I have "Superzap" and was able to identify and zero out the last disk sector of the text and then load the truncated version. What does one do if one does not have a way to get into the disk? The manual should emphasize this problem. Perhaps the program could be modified to flash a warning as the text in memory approaches a quantity that could not be safely saved and reloaded.

4) The instructional tapes with the manual are very helpful for getting one started. But the manual alone is not very good. It needs a lot more descriptive text and more examples of different types of formatting, problems that can arise and the like.

5) DOS allows one to work directly from the disk. You can print and read actively off the disk. I had hoped that some of this capability would be carried into Scripsit so that one would not be confined to working only with what is in memory, as is also the case with Electric Pencil and the main criticism of the program. I want to be able to take addresses and file copy from disk and mix and match it with form text on another disk or in memory to print out customized documents. I feel the TRS-80 disk system has that capability. I am disappointed that Scripsit has not capitalized on it. Are there plans to do so in some later, updated version?

Despite my carping, I am on the whole satisfied with Scripsit. I feel, though, that such advantages as it has over Pencil come at the cost of far greater complexity. I would like to see all the formatting commands and instructions put in a separate subprogram instead of as part of the text, for example, displayable on command on that bottom line.

I am also satisfied with the TRS-80, more than satisfied.—*Peter J. Brennan* ☐

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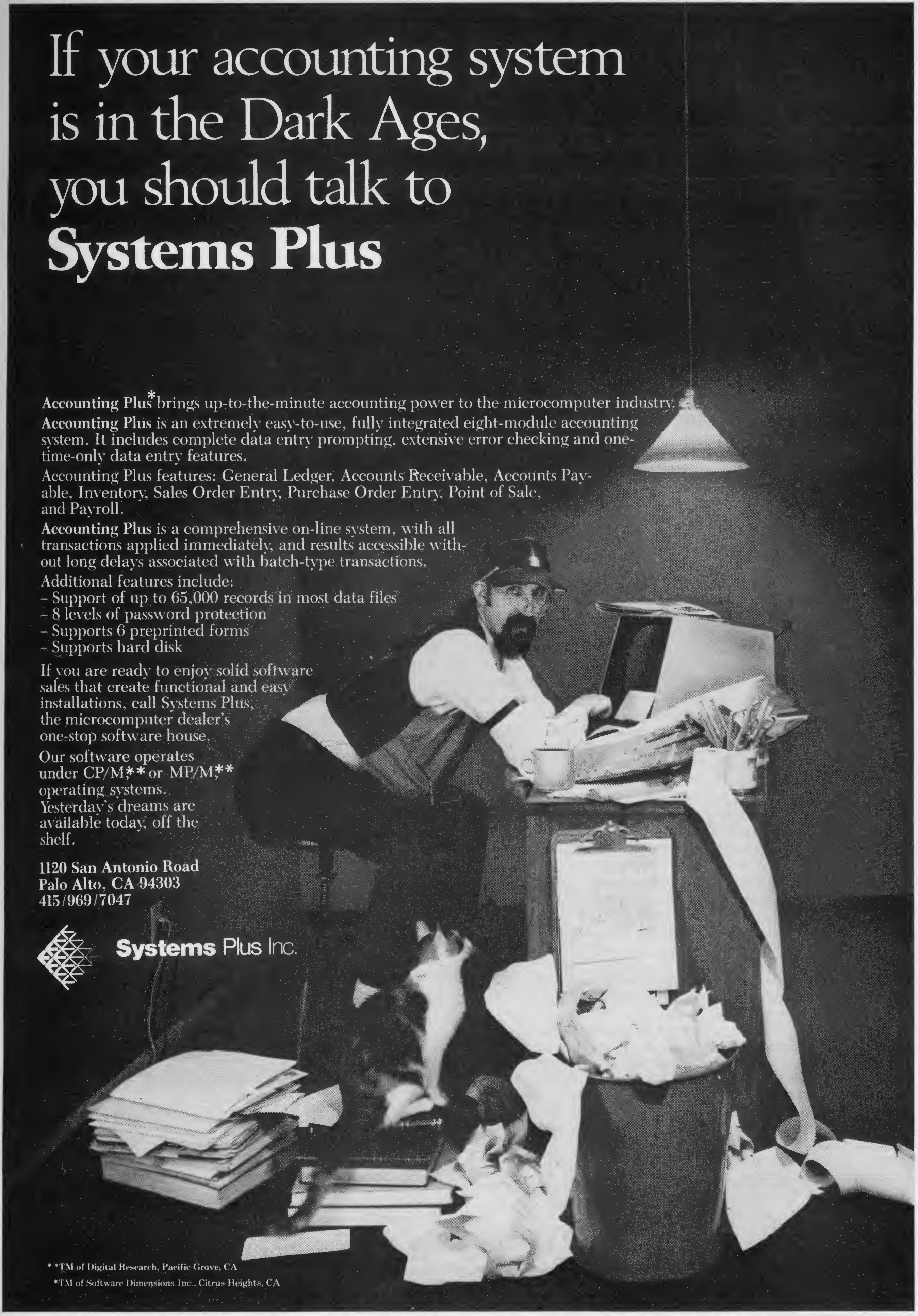

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DOS FEATURES

- A 252+ page technical manual with index and detailed table of contents.
- Commands **SYSTEM** and **PDRIVE** allow the user to configure/customize his/her own DOS
- Depending on installed hardware, **NEWDOS/80,** via the **PDRIVE** command, supports within one system, mixtures of single/double density, single/double head, 5 or 8 inch drives with single/double volume diskettes of up to 7680 standard 256 byte sectors. 80 track drives can read 35/40 track diskettes. Parameters for 10 drives may be prespecified though only a maximum of 4 are in use at anytime. ADR not provided.
- LNW 5/8 and Omikron mapper boards supported.
- APPARAT, AEROCOMP, AM, LNW, and PERCOM, disk doublers supported.
- Most CPU speed up mods may be used though not specifically supported.
- Model I/III data diskette interchangeability when both computers are operating under **NEWDOS/80** version 2.0.
- Model I 2.3 TRSDOS compatible.
- **COPY** to/from Model I 2.3B and Model III TRSDOS diskettes (no other useage allowed).
- Single drive **COPY** and Copy By File features.
- Depending on installed hardware, the system volume may be single/double density, single/double sided, 5 or 8 inch and up to 7680 sectors.
- **RUN-ONLY** program mode restricts the operator to program defined input only.
- **MINI-DOS** allows the executing program to be interrupted by the operator to perform one or more of the 51 DOS commands executable under MINI-DOS, and then continue the interrupted program's execution.
- **CHAIN** or **DO** commands activate chaining whereby keyboard input comes from the specified disk file, allowing a pre-determined set of commands and/or parameters to be automatically inputted.
- Dump display to printer function.
- Enhanced **DEBUG** facility (14 commands) allows interrupting current program execution, inspecting/altering memory or disk, and resuming execution, continuous or single step, with/without stops.
- DOS vectors defined for Assembly Language programmers.
- DOS-CALL allows user programs and BASIC to execute DOS commands.
- The programmer may create his own resident DOS commands.
- Programs may enable/disable user routines driven off the timer interrupt.
- The programmer may create his/her own resident DOS commands.
- Model I built-in lower case driver, blinking cursor, auto key repeat.
- **ROUTE**ing of keyboard, display, printer and (Model III only) RS232C. May be routed to a user routine in memory, but not to/from disk unless via a user routine.
- Except for the spooler, there are no high memory routines for DOS or BASIC; this includes **ROUTE** and **CHAIN** functions.
- Lower case DOS commands honored.
- Full error messages displayed instead of error codes.
- 31 enhanced **COPY** parameters.
- Copy By File allows 6 criteria for file selection.
- 15 enhanced **FORMAT** parameters.
- Partial diskette re**FORMAT** permitted.
- File **PURGE** by wildcard extents and/or user files.
- **DIR**ectory command allows wildcard extents, user files, short or extended format, dump to printer.
- User may specify diskette's directory location.
- Expanded directory provides for up to 222 file entries.
- Some DOS commands may be aborted without reset.
- **R** command repeats last performed DOS command.
- **CREATE** command to pre-allocate a disk file.
- **ERROR** command displays error message associated with error code.
- **HIMEM** command sets/displays DOS/BASIC high memory address.
- **DATE** command sets/displays computer's date.
- **TIME** command sets/displays computer's time.
- Model III **FORMS** command for printer control.
- Model III **SETCOM** command for RS232 control.
- Enhanced **LIST/PRINT** commands for ASCII files with pause, abort and partial file listing.
- Alter chaining state via the **CHNON** command or commands within the chain file.
- A program or a chaining sequence may display a message with/without pause.
- **CLEAR** command to zero memory and to purge routes, user DOS commands and user timer routines.
- Commands to enable/disable BREAK key, blinking cursor, lower case driver
- **PROT** command to change diskette **NAME/DATE/PASSWORD**
- **ATTRIB** command to change a file's attributes.
- **CLS** command to clear screen.
- **AUTO** specifies the command to execute automatically at reset/power-on.
- **SYSTEM** specifies the default system configuration values (usually enable or disable) which become effective on RESET/POWER UP.
  - Diskette/file password checking
  - **RUN-ONLY** mode
  - Keyboard debounce (Model I)
  - Screen dump to printer (JKL)
  - **DEBUG 123** entry
  - **MINI-DOS**
  - Break key as keyboard key
  - Hardware lower case (Model I)
  - Assign default drive number for **DIR**
  - Assign default drive number for file creation
  - Memory protect value
  - Clear key as keyboard key
  - Disk master password required for full diskette or **CBF COPY**
  - Auto Repeat key function
  - **TIME/DATE** question on power-up
  - **TIME/DATE** question on reset
  - Display disabled until operator/program reenables
  - Manual operator chaining pause/abort
  - Manual operator **AUTO** command override
  - **R** = repeat last DOS command performed
  - Built-in lower case driver (Model I)
  - Lower to upper case toggle
  - Blinking cursor
  - Number of physical drives on computer
  - Number of disk I/0 retries
  - Time delay for 1st repeat of auto repeat key
  - Specify the cursor character
  - Specify the write of the directory sector's address mark for Model I single density diskette in Model III format for easy Model I, Model III diskette exchangeability

---

Apparat, Inc.

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Why NEWDOS/80™ VER. 2.0 Is the Best DOS for your TRS-80 Model I or III Computer

DISK BASIC FEATURES

- In one statement from DOS READY, BASIC can be brought up, the number of files set, the memory size set and a program LOADed or RUN.
- **RUN-ONLY** prevents the operator from getting to READY or DOS READY, thus giving the program almost total control.
- Via the CMD function, all DOS commands are executable from BASIC, either directly or dynamically.
- **MINI-DOS** is available from BASIC.
- **DEBUG** is available from BASIC.
- **CHAIN**ing is available from BASIC.
- Variable passing between programs via the **V** parameter of RUN.
- Abbreviated commands:
  (A)uto; (D)elete; (E)dit or comma; (L)ist or period
- Accidental text line deletion more difficult
- Text line scrolling foreward or backward.
- Text page scrolling foreward or backward.
- **DI** moves text line to new position
- **DU** duplicates text line to new position
- Built-in **RENUM**ber with line number and limited syntax error check. A portion of text may be moved to another part of the program with all references to that code resolved.
- Built-in **REF**erence function will display/print references to all line numbers, integers and variables. It will display references to a single line number, integer, string, function code (reserved word) or a group of packed or unpacked characters, and then allows displaying of each referencing text line in turn with editing as necessary.
- A program may be loaded into reserved high memory via CMD or MINI-DOS and its execution address extracted from the two bytes at 17411 (4403H).
- **MERGE** functions with packed or ASCII text files.
- Built-in text space eliminator and/or remark deleter.
- Built-in calendar date conversion.
- Dynamic **ERASE** of selected variables, keeping all others.
- Dynamic **KEEP** selected variables, **CLEAR**ing all others.
- After clearing an array via **ERASE** or **KEEP**, the array may be redimensioned via **DIM.**
- Dynamic text line deletion.
- Dynamic text line insertion via **MERGE**, which with dynamic **DELETE**, allows use of overlays.
- **SWAP** contents of 2 variables of the same type.
- Single Stepping starting at specified text line number.
- In-memory sort of up to 9 arrays in either ascending or descending order
- **RENEW** function to reinstate **NEW**ed program.
- Full BASIC error messages, including associate DOS error message, if applicable
- With default start up parameters and no reserved high memory, 48K RAM has 38261 bytes available.
- SUPERZAP, DIRCHECK and other programs using only memory from 5200H to 6FFFH can be executed directly from BASIC without disturbing the program text or variables (if 8K BASIC free memory available, exclusive of string area).

FEATURES of NEWDOS/80 enchanced BASIC disk file I/O.

- In addition to TRSDOS sequential and random file types, **NEWDOS/80** has two new file types (Marked Item and Fixed Item) divided into five subtypes **(MF, MU, MI, FF** and **FI)**
- These five subtypes do not require **LSET, RSET, MKI$, MKS$, MKD$, CVI, CVS** or **CVD;** instead, **GETs** and **PUTs** are done directly to/from the variables named in a list.
- The string separating character sequence ; " , " ; used with PRINT is not used with the new file types; instead only a comma is used as the separator.
- **MU** files are used as an option to the older PRINT/INPUT files.
- **FF** files are used as an option to the older RANDOM files.
- Record lengths up to 4095 bytes supported.
- Records may be all of the same length (**MF** and **FF**), of varying lengths (**MU**) or unknown length (**MI** and **FI**).
- Sequential files may be accessed randomly.
- Files may be accessed by **R**elative **B**yte **A**ddress to allow accessing of variable length or unkown length records.
- Existing files may be extended.

UTILITY PROGRAMS INCLUDED WITH NEWDOS/80

- **SUPERZAP** is a disk/memory display and modification program, also used as the vehicle for installing patches to **NEWDOS/80.**
- **DISASSEM** is a Z80 load module (CMD) disassembler that builds cross reference tables for all location references including those by JR instructions, includes in the disassembly printable characters for all hex bytes to help locate character strings and sends the disassembly to the display, printer or a disk file. The disk file can then be edited and/or assembled using EDTASM, if it is not too large.
- **DIRCHECK** is a program that displays directory contents and checks directory integrity (its primary function), displaying specific error codes to assist user attempts at directory trouble shooting and/or repair. Optionally will zero out unused (dead) file names.
- **EDTASM** is Apparat's enchancement of Radio Shack's 1978 tape editor/assembler program to operate from disk and with disk files. Requires purchase of that Radio Shack program (not a newer one) as a pre-condition of use of Apparat's EDTASM.
- **LMOFFSET** allows load module (CMD) transfer between disk and tape. Displays program start, end and entry addresses. Optionally allows load address relocation (not execution relocation) and subsequent execution as from non-disk BASIC via SYSTEM.
- **CHAINBLD** is a mini-text editor for creating/maintaining chaining files.
- **NEWDOS/80** manual chapter titles and page counts
  1. Introduction (5)
  2. DOS Library Commands (52)
  3. DOS Routines (12)
  4. DOS Features (14)
  5. DOS Modules, Data Structures, and Miscellaneous Information (12)
  6. Additional Programs Supplied on **NEWDOS/80** Diskette (22)
  7. Disk BASIC, non-I/O Enhancements (17)
  8. Disk BASIC I/O Enhancements and Differences (21)
  9. Error Codes and Messages (2)
  10. Glossary (9)
  11. Error Reporting, Incompatibility Handling, and Patching (8)
  12. Conversion Information and Miscellaneous Comments (9)
  13. ZAPs (increasing with time)
  14. Appendix A: Marked and Fixed Item File discussion (47)
  15. Appendix B: Marked and Fixed Item File examples (18)
  16. Index (4)
- Full time support staff
- Information, minor enhancements and corrections to **NEWDOS/80** are issued, at no charge, to registered owners only.

NEWDOS/80 Version 2.0 for the model I is a separate and distinct product from the model III. Each is sold separately.

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CIRCLE 124 ON READER SERVICE CARD

Electric Pencil 2.0

David H. Ahl

creative computing
SOFTWARE PROFILE

Name: Electric Pencil 2.0
Type: Word Processing
System: TRS-80 Model I and III, LNW
Any operating system
Format: Cassette or disk
Language: Machine (transparent
to user)
Summary: Comprehensive, user
friendly word processing
package
Price: $89.95
Manufacturer:
IJG, Inc.
1260 West Foothill Blvd.
Upland, CA 91786

Why, you might ask, would we do a review of *Electric Pencil* in 1982? After all, the program has been on the market for six years and it has been reviewed in *Creative Computing* several times previously. Indeed, I have been using "Pencil" off and on for the past five years.

But there are several reasons for a new review at this time. First, we are reviewing a new, modified version (2.0) for the TRS-80. Second, it is now being marketed by IJG, Inc. rather than Michael Shrayer, the original author. Third, this is the first version available for the TRS-80 Model III.

"Software packages, like people, usually have 'personalities,'" we are told in the first line of the manual. How true! Users of Pencil on the Altair, Imsai, Sol-20 and other early S-100 bus computers will remember the friendly personality of Pencil. Here, for the first time was a word processing package that didn't require the user to be on a first name basis with every IC, connector and board in his computer. Oh yes, certain special pieces of hardware were required such as a memory mapped video display board and a printer with the Diablo 1620 control codes. But for the most part Pencil was easy to use, reasonably forgiving, and reliable.

Electric Pencil 2.0 is one of the most user friendly word processing packages available.

On the other hand, early users will remember the end of line problem. In particular, when the end of a line was reached on the screen and the word being typed had to be moved (by the software) to the line below so it would not be broken, Pencil would generally drop a character or two. Similarly, characters would be dropped when the user typed quickly while inserting. Thus, most users learned to sense the approaching end of a line and slow down their typing speed for a word or two.

Needless to say, this was the very first thing I tried with Pencil 2.0. Hurrah! Typing at full speed, it dropped characters only very infrequently and not until the document was quite large and the screen was full of text. So it passed my first test. Not with flying colors, but it passed. How does the rest of it stack up?

Character Oriented Word Processing

In Pencil, text is typed in as a continuous "string" of characters and handled as such. Since the lines that will be sent to the printer are not specified in advance, any number of characters, words, sentences or paragraphs may be inserted or deleted anywhere in the text. The entire text is shifted down or up as the user inserts or deletes material. Everything appears on the video screen as it occurs so the user can see exactly what happened.

Carriage returns at the end of a line on the screen and word hyphenation is not required since Pencil formats each line

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and the features that made it famous:

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- 8 character labels with sorted symbol table
- Built-in symbol table cross-reference
- Nested *INCLUDES (source file chaining/nesting)
- Lower case support (Model 3 only)
- Over 175 pages of documentation including Z-80 Technical Manual
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#1020-10	Mod 1	$19.95
#1220-10	Mod 3	$19.95

FILEXFER: transfer any disk file between two TRS-80s. Use direct cable link or RS modems. Mod 1 and Mod 3 can be mixed. RS-232 and disk reqd.

#1040-10	Mod 1 and 3	$49.95

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BASIC Editor Review

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—Bruce Douglass
80 Microcomputing
BASIC Editor Review

"During the first 3 days of use, M-ZAL saved more money in programmers time than we had paid for the product."
—William Denman
Author of Asylum
MED SYSTEMS

"The editor has at least doubled my productive capacity...Having spent a good deal of money on so called 'utilities' that don't work, it's a delight to find one that not only lives up to its claims but surpasses the advertising."
—BASIC Editor user

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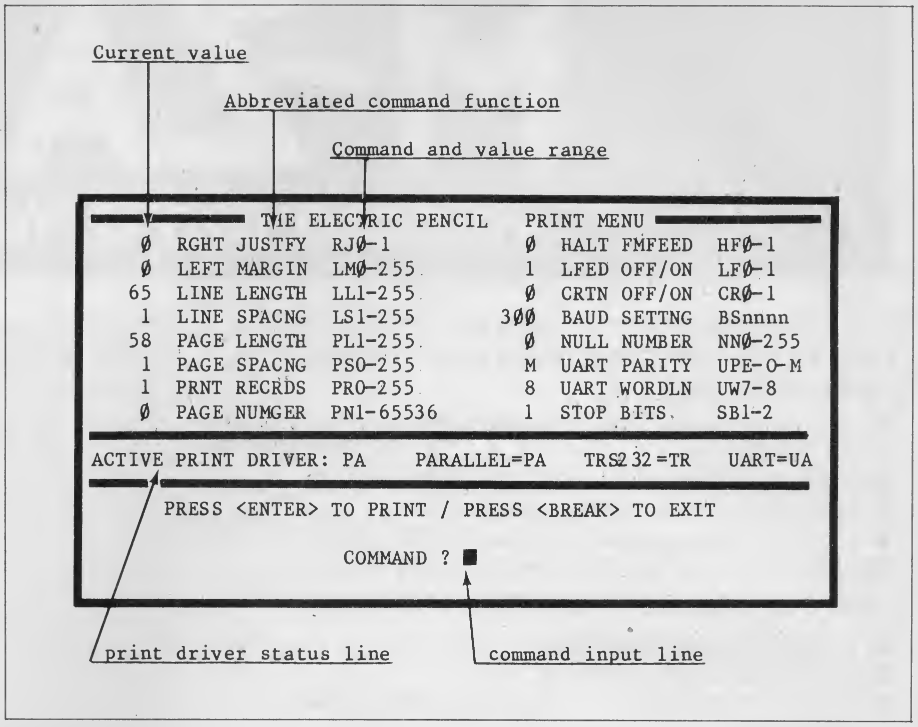
CIRCLE 125 ON READER SERVICE CARD

Pencil, continued...



```
             THE ELECTRIC PENCIL      PRINT MENU
  0  RGHT JUSTFY  RJ0-1          0  HALT FMFEED  HF0-1
  0  LEFT MARGIN  LM0-255        1  LFED OFF/ON  LF0-1
 65  LINE LENGTH  LL1-255        0  CRTN OFF/ON  CR0-1
  1  LINE SPACNG  LS1-255      300  BAUD SETTNG  BSnnnn
 58  PAGE LENGTH  PL1-255        0  NULL NUMBER  NN0-255
  1  PAGE SPACNG  PS0-255        M  UART PARITY  UPE-O-M
  1  PRNT RECRDS  PR0-255        8  UART WORDLN  UW7-8
  0  PAGE NUMGER  PN1-65536      1  STOP BITS    SB1-2

ACTIVE PRINT DRIVER: PA     PARALLEL=PA   TRS232=TR   UART=UA

        PRESS <ENTER> TO PRINT / PRESS <BREAK> TO EXIT

                        COMMAND ? ■
```

automatically when it goes to the printer. Of course, specifying right justification on very short lines can lead to awkward spacing between words since Pencil will justify even a line with just two words. In general, "ragged right" (no right justification) is more pleasing to the eye for line lengths less than 60 characters or for text with many long words.

By using the Search or Search and Replace function, any "string" of characters may be located and replaced with any other string of characters. More about this later.

Control and Editing Functions

The text entry mode commands and functions are divided into six groups. Some contain simply the "expected" commands while others are unusual in one or another respect.

The eleven cursor control commands are what one might expect in a comprehensive word processing package. Commands are included to move the cursor up, down, right and left; to the beginning and end of the file; to scroll up and down; to move to the beginning of a line; and to tab eight spaces right. Most are two keystroke commands, i.e., the control (clear) key held down while pressing a letter key. However, up, down, right and left are controlled by single keystrokes of the four arrow keys. Holding a key down repeats its function.

Nine editing functions are included for deleting and inserting characters, lines and blocks. Especially convenient is the insert character mode. Upon pressing Control/F, the user enters insert mode and all subsequent characters are inserted until Control/I cancels insert mode. Scripsit, in comparison, requires the user to press Control/X (for line insert), insert characters and press Clear to close up the text. I find this less desirable for correcting passages since the text following the insert disappears off the bottom of the screen.

The five utility functions include string search, continue search (after finding an occurrence of the search character or word), and a repeat function for typing or deleting the same character many times. Two other functions select the system menu and print menu.

Special purpose functions are included to abort and exit the current mode, to lock and release upper case, and to turn the cassette port on and off. This last function is intended for typing dictation from an audio cassette tape. While I don't ordinarily type my own dictation, it seems that this might be a useful function for those who do transcribe tapes.

Special characters may be embedded in the text to go to the printer or storage. These include the "Enter" character, form feed, a null and a "wild card" for string searching. I found this less than useful since the beginning and end character of a string must be specified. The example in the manual shows how amateur radio call letter sequences can be selected and also mentions the possibility of selecting ranges of dates. I would find a function to select a portion of a list alphabetically much more useful, i.e., all those last names beginning with C.

The only functions with which I was particularly disappointed were those for underlining and boldface. Underlining requires the user to type a group of Control/0 characters above (!) the word to be underlined. The remainder of the line containing the underline characters must be blank. This procedure contrasts with Electric Pencil II (for S-100 systems) which simply requires one underline character at the beginning of the text to be underlined and another at the end. Boldface in Pencil II is handled similarly. In Pencil 2.0, boldface is achieved by overstriking a line or overstriking with a 1/120th inch space between overstrikes. Not at all convenient.

Printer Menu and Control

When the user is ready to print out text, pressing Control/K causes the printer menu to be loaded and appear. It allows the user to set 17 functions such as right justify on or off, page length in lines, printer baud rate, etc.

The printer routine has the ability to send output to the parallel, serial or UART (serial communications) port of the TRS-80. Pencil II (S-100) had printer drivers built in which took advantage of the specific capabilities of printers such as the Diablo 1620, Qume Sprint 5, NEC Spinterm, etc. If a printer could print in two directions, Pencil II used it. If a printer had a large buffer, Pencil II used it. Not so with Pencil 2.0. To take advantage of special printer capabilities, the user must write his own print driver, not something that the average TRS-80 owner is likely to do.

Nevertheless, I found that using my Diablo 1641 at 300 baud (it can run at 1200), was not too onerous given all the other familiar and friendly features of Pencil 2.0.

System Menu and Commands

The System Menu gives the user three pieces of information about the text being created, in particular, the number of words in the file, records in the file (paragraphs or heads terminated by "Enter"), and available free memory. As a writer, I relate more readily to number of words as reported by Pencil than to number of characters as reported by Scriptsit and some other word processing packages.

Eight system commands are provided related to cursor speed (default speed 5 seemed fine to me), print drivers, and clearing text. These latter commands are the ones most often used and allow text to be cleared totally or from the cursor to the beginning or end of a file. This feature is one which is most useful when appending one document to another.

File load and save commands are provided for cassette tape, Exatron Stringy Floppy, and disk. Obviously most users will use only one file device. While it is difficult to imagine doing any serious volume of word processing with just a cassette tape, at least the commands are provided for those who have not upgraded their mass storage.

Special Features and Techniques

A section in the manual discusses special techniques and tricks (in the inimitable style of H. C. Pennington). Writing Basic programs with Pencil is described. The main reason for doing this is to take advantage of the full screen editing capabilities of Pencil. Of course, one can't debug the program while it is being written with this technique. However, for producing easy to read documentation, Pencil is outstanding.

Pencil also has the ability to use VisiCalc files saved under the data interchange format (DIF). However, Pennington also describes a way to make listings of the row and column formula entries of VisiCalc. The technique is creative but somewhat cumbersome. Although I use VisiCalc regularly, I did not see the advantage of listing formulas with Pencil instead of using the /SS:P command sequence in VisiCalc. But perhaps I'm missing something.

The manual also discusses ways to embed line printer codes within text. Of course, a "smart" printer such as a Diablo, Qume, NEC, Epson, etc. is required to use these codes. Codes are not provided in the Pencil software or manual for different printers; these can be found in printer manuals. We use this technique at *Creative Computing* to embed typeset codes within text so that it may be transmitted directly to a typesetting machine.

> ***During the wrap-around process, Pencil is so busy rearranging the screen that it ignores the keyboard and keystrokes are missed.***

It's Not All Perfect

While Electric Pencil 2.0 is quite marvelous, it still has some flaws. Inserting and deleting occasionally behave differently than they ought to. These glitches occur mostly when deleting at the beginning of a line (on the screen) or inserting at the end. Also, rapid typing while inserting is not possible. During the wrap-around process, Pencil is so busy rearranging the screen that it ignores the keyboard and keystrokes are missed. This is the same reason that characters are occasionally dropped during fast typing at the end of a line, although, as mentioned earlier, this glitch was much more evident in earlier versions of Pencil.

The number of continuous characters that can be typed without a space is limited to the screen length. This makes it somewhat difficult to do long underlines, dotted lines and the like. To do these, a concatenate character (Control/right arrow) must be used; this frequently causes me to lose count of the total number of characters.

Automatic centering is no longer a feature of Pencil 2.0. I used this extensively in Pencil II and I miss it.

Pencil only saves material after the cursor position. Thus, upon completion of a document, if the user simply calls the save routine and leaves the cursor where it was at the end, Pencil will save nothing. Fortunately, unlike previous versions of Pencil, this one warns the user that he is saving nothing or just part of a file. The user, of course, must be attentive to these screen messages or face up to re-creating a document (as I have done many times with Pencil II). To the credit of the authors, the manual provides an excellent procedure for making back-up copies of disks.

Despite these glitches, I feel Electric Pencil 2.0 is one of the most user friendly word processing packages available. Furthermore, the new lower price of $89.95 makes it an outstanding value. For more information, contact IJG, Inc., 1260 West Foothill Blvd., Upland, CA 91786. ☐

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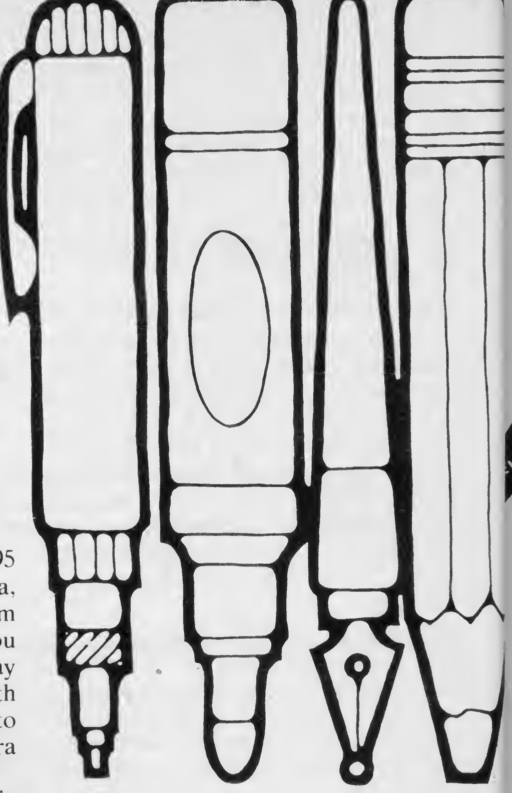

Improving on Scripsit

Stephen Kimmel

creative computing
SOFTWARE PROFILE

Name: Scripmod
Type: Word processing
System: Model I or Model III TRS-80, 32K or 48K, 1 disk drive
Format: Disk
Language: Z-80
Summary: Good
Price: $39.95
Manufacturer:
The Computer Store
4949 S. Peoria
Tulsa, OK 74105

I discovered the deficiencies of Scripsit about halfway through chapter 15 of my third novel *Lord of High Places*. The alien hero, a green, semi-intelligent, dinosaur-like creature, is trying to bluff his way out of certain disaster. Standing on his rear four legs he screams "Rhapaka is nothing compared to the Star Lord!" I decided that bit of deathless prose needed added emphasis and should be underlined.

Although I had dutifully listened to the six-hour course that came with Scripsit, I couldn't remember how to do that. After three more hours of searching through the manual, the reason became clear. I couldn't remember how to underline because Scripsit doesn't allow underlining.

"Ah come on!" I bellowed. "You sold me a $100 program that won't make the $2000 printer you sold me underline? Or backspace. Or print a copyright character. Or. Or. Or."

Filling the vacuum

Two programs have apeared to fill this vacuum. Superscript is reviewed elsewhere in this issue. Less well-known (read "not as heavily advertised") is Scripmod, $39.95 from The Computer Store (4949 S. Peoria, Tulsa, OK 74105). It is a single program that modifies your Scripsit each time you use it. While the Scripmod system may seem awkward, I have no difficulty with it. I simply put the program as an Auto statement and it takes perhaps two extra seconds. I can't tell the difference.

Scripsit's deficiencies come in two basic classes: the missing directory from within Scripsit and the lack of ability to send the various printer control codes. Scripsit doesn't bother to send anything but the minimal set of control codes to the printer. If you are going to write a program to modify Scripsit, you have to solve the problem of how to tell the printer where to start underlining and where to stop all the other things that printers do in their heart of darkness.

Enter Scripmod

In Scripmod you type <Control> <T> at the point you want to begin or end a special function and a British pound sign (a fancy L) appears. (You can't get that character from within Scripsit under normal circumstances.) When the computer encounters the sign it goes to a special control character instruction that you have built into the text to find out what the pound sign means this time. For example, the instruction >CC=O,N,O,N will tell the program to send control code 14 (O is the fourteenth letter) to the printer the first time it encounters the special instruction, 13 the second, 14 the third and 13 the fourth. On my particular printer, a Daisy Wheel II, a 14 control code means to start underlining and a 13 means to stop. So,

```
  CC=O,N
LScripmodL
```

will print the word "Scripmod" and underline just that word.

Scripmod can send any control code that your printer is capable of receiving since it isn't limited to just those built into the program. That's also why there are no extra drivers; the one program will support anything that can be supported by a TRS-80.

O and N represent underline-related instructions on the Daisy Wheel II and the Line Printer IV but they may well be subscripting on a Qume or a Diablo. With Scripmod you have to figure out which functions are represented by what letters. It's a learning process and the authors encourage you to experiment. Perhaps your printer has control codes the manufacturer neglected to tell you about.

As for the other deficiency; to display a directory from within Scripsit, use a <Control> <M>. The program then asks which drive you want and gives you the appropriate directory.

Future Modifications

There are still more features that would be useful for a word processing package. My Daisy Wheel printer is capable of printing twice as many characters as Scripsit will show. How about somebody writing a modification to do that? I don't know about anybody else but I frequently do articles too long for even a 48K machine. Scripmod's next version will enable one section of text to load the next one, thus permitting an infinitely long document. I doubt that I'll need one that long, but I could use one capable of handling 300 pages of text. I suspect that they'll use a final control command at the end of a section to load the next section.

Let's go wild. What else would be nice to have? TRSDOS has a date function. Why not permit Scripsit access to that? Have the letter date itself. Or how about letting Scripsit access external mailing lists? Has anyone done these thing yet? ☐

Stephen Kimmel, 4756 S. Irvington Place, Tulsa, OK 74135.

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If Only Scripsit Could...

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Carl Iseli

creative computing
SOFTWARE PROFILE

Name: SuperScript
Type: Word Processing Utility
System: TRS-80 Model I, Disk Drive
Format: Disk
Language: Machine Language
Summary: Enhancement to Scripsit
Price: $50.00
Manufacturer:
Acorn Software Products, Inc.
634 N. Caroline Ave., S.E.
Washington, DC 20003

In general, the Scripsit word processing system for the TRS-80 Model I from Radio Shack has received rave reviews. It is just about the most versatile such program available for anything near its price. If you plan to use a word processor professionally, however, "just about" doesn't quite make it. Scripsit comes up lacking in several areas—some of them major, others relatively trivial. But that was before Acorn Software Products, Inc., 634 North Caroline Ave., SE, Washington, D.C. 20003, introduced a dandy modification called *SuperScript* by Richard Wilkes.

Underlining, superscripting and subscripting, special characters and boldface type are some of the more obvious abilities *SuperScript* adds to your word processing. Others, like the ability to prodce either "slashed" zeroes(0) or the regular variety (0), forced spacing, keyboard text insertion during printout and type pitch selectability, can come in handy more often than you might expect. Finally, *SuperScript* has added a couple of features that I can credit with having saved what's left of my sanity!

Until you've experienced the thrill of trying to save a twenty-page manuscript on disk, only to have the "DISK AREA FULL" message pop onto the bottom of the screen, you won't fully appreciate the ability of *SuperScript* to read a disk directory and kill files. Don't be smug, it *will* happen to you—probably at 3 a.m.—and your spare diskette box *will* be empty. After modifying Scripsit with *SuperScript*, you will be able either to find a disk with enough free space or kill some unnecessary files. And all the while your text remains safe and sound, waiting to be dumped whenever you are ready.

SuperScript is not a word processing system by itself, nor does the disk supplied even contain a complete Scripsit program. It combines with and modifies your copy of Scripsit, giving it all the capabilities you've wished for. The *SuperScript* disk contains the basic Scripsit modification, driver routines for several popular printers and a file transfer utility, with a versatile, general duty lower-case driver thrown in as a free extra. You transfer your Scripsit/LC program to this disk—using the file transfer option if you have only one disk drive. Then specify which print driver you will use, and the program will combine Scripsit, the modification and the print driver into one program, called "SCRIPT/CMD." SCRIPT can now be copied onto any disk using the COPY command if you have two or more drives, or the file transfer utility on *SuperScript* for single drive owners.

Carl Iseli, 2108 Kingshouse Rd., Silver Spring, MD 20904.

In order to use *SuperScript*, you must have the disk version of Scripsit and your TRS-80 must have a lower-case modification installed. The reason for the first restriction is that the tape version of Scripsit uses different memory locations than does the disk version. The lowercase requirement shouldn't bother too many people; after all, a word processer without lowercase is like Perrier without bubbles! To utilize the printing capabilities fully, you need one of the daisy-wheel, thimble type, or other letter-quality printers: Radio Shack's Daisy-II and Lineprinter IV (and its clone, the Centronics 737), Diablo (parallel or serial), NEC Spinwriter (5510 or 5530, Qume, Sanders, and Anderson-Jacobson. *SuperScript* will support other printers with underlining and slashed zeros only, provided the printer is capable of backspacing.

Active text insertion allows you to put in text from the keyboard while you are printing a Scripsit file.

Table 1. SuperScript Functions.

CONTROL CHARACTERS

Letters enclosed in brackets indicate that they are typed while holding down the "control" (@) key.

Control	Function	Remarks
[U]	Underline	Used to begin & end function
[Y] [U]	Boldface	Used to begin & end function
[T]	Superscript	Used to begin & end function
[B]	Subscript	Used to begin & end function
[Y] 0	Slashed Zero	[Y] must precede each zero to be slashed
[N]	Required Space	See text
[O]	Left Bracket [	Appears as up-arrow
[P]	Right Bracket]	Appears as left-arrow
[K]	Left Braces {	
[L]	Right Braces }	
[I]	Caret ∧	Appears as right-arrow
[Y] [B]	Set 10-Pitch	
[Y] [T]	Set 12-Pitch	
[Y] [Y]	Insert Text from Keyboard During Printout	

COMMAND FUNCTIONS

These are added functions that can be used by pressing the BREAK key, followed by the command.

Command	Function
?D	Displays the disk directory and amount of free disk space. Text is restored by pressing ENTER or space bar.
K filename	Kills the named file from the disk and frees its space. "filename" can be any valid DOS name: TVPROD/SCR:0, etc.

One of my questions in evaluating any modification is: Does it accomplish its purpose without introducing bugs in the target program? In this, *SuperScript* really shines. The modification is almost completely invisible to the Scripsit user; you can use Scripsit exactly as described in the Radio Shack documentation and ignore the added capabilities if you like. The only exceptions to this are in the copyright notice that appears at the beginning of the program, and in the "L" (load file from disk) command. Normally, you needn't use a disk filename when you specify the "L" command, assuming that you have previously loaded or saved a file using its name. Since "L" is also used to find the length of the document in memory, it is conceivable that you might accidentally load a file—thus destroying whatever is in memory—while simply trying to find the length of the current file. Under *SuperScript*, you *must* specify a file name each time you load it.

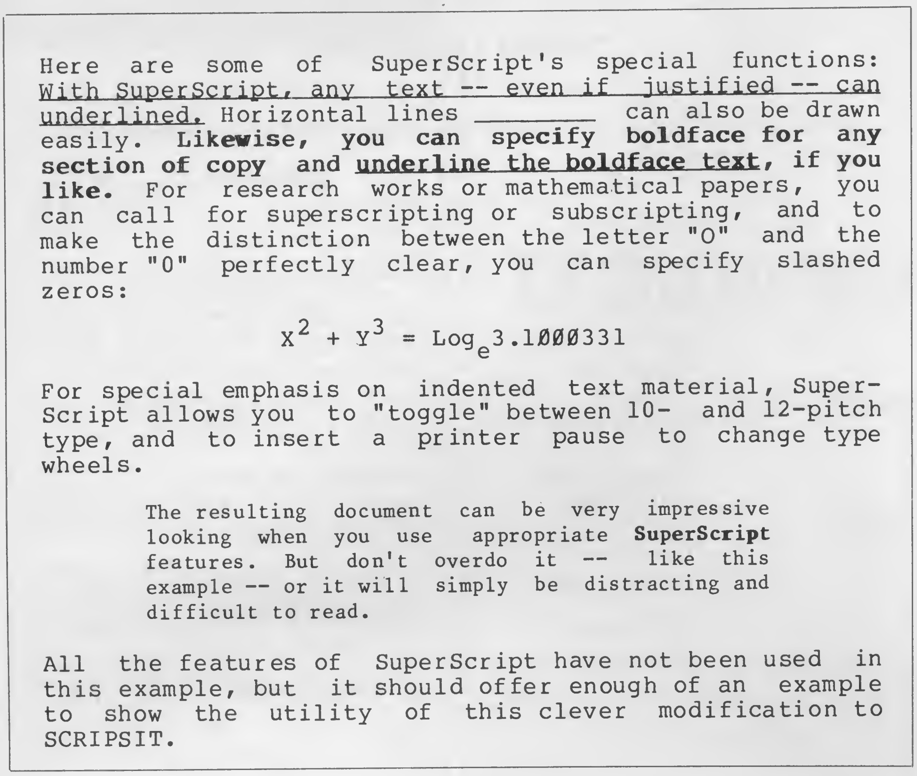
Printing Options

Using the new features is simplicity itself. The print modifying commands are embedded into the text using the "@" key as a "control" key. For example, to start underlining a section of text, you press the "U" key while holding down "@" (control). At the point where you wish the underlining to end, just press "control-U" again. Similar control codes are used for other print operations (Table 1). Each of the new control codes has a unique graphic block associated with it that becomes embedded in the text you see on your screen. Even these blocks have been chosen to indicate, as well as possible, the functions they perform. The underlining indicator is a small square below the print line. Superscripting and subscripting indicators are tiny rectangles above and below the line, respectively. The indicator for boldface even resembles a "b" in block graphics.

Active text insertion allows you to put in text from the keyboard while you are printing a Scripsit file. Thus you can insert names or other information in a form letter, etc. This can only be done in unjustified text, and is accomplished by typing "control-Y" twice. When these characters are encountered during a printout, the printer pauses and the bottom line of the screen (the "Command Line") awaits keyboard entry of the text to be inserted; after typing the desired insertion, pressing ENTER causes it to be printed and the printout to resume. Neat!

The purpose of the "required space" command is a little less apparent. When printing justified text, Scripsit randomly inserts spaces as necessary to make the lines come out even. Occasionally, this puts two or more spaces between words that really need to "go together," like "Atlantic City" (which looks strange if it is printed as "Atlantic   City"). By typing "Atlantic <control-N> City," SuperScript sees one 13-letter word (where one of the letters happens to be a space) rather than an eight-letter word, a space, and a four

Figure 1. Example of SuperScript Text.



Here are some of SuperScript's special functions: With SuperScript, any text -- even if justified -- can underlined. Horizontal lines ________ can also be drawn easily. **Likewise, you can specify boldface for any section of copy and underline the boldface text, if you like.** For research works or mathematical papers, you can call for superscripting or subscripting, and to make the distinction between the letter "O" and the number "0" perfectly clear, you can specify slashed zeros:

$$X^2 + Y^3 = \mathrm{Log}_e 3.1000331$$

For special emphasis on indented text material, SuperScript allows you to "toggle" between 10- and 12-pitch type, and to insert a printer pause to change type wheels.

> The resulting document can be very impressive looking when you use appropriate **SuperScript** features. But don't overdo it -- like this example -- or it will simply be distracting and difficult to read.

All the features of SuperScript have not been used in this example, but it should offer enough of an example to show the utility of this clever modification to SCRIPSIT.

letter word. It will always print with only one space. Another place where the required space comes in handy is when you want to be sure that a group of words appears on the same line. Since the group is seen by the program as one big word, it will print on the same line no matter how you format your text.

Other print control codes allow the printing of brackets ([ ]), braces ({ }), and carets (∧). With some printers, *SuperScript* lets you toggle between ten characters per inch (10-pitch) and twelve characters per inch (12-pitch). Though you would normally set your type pitch at the beginning of the text, this, combined with the printout pause capability, lets you do some pretty fancy printing: You could start printing in 10-pitch, then pause the printer, switch type-wheels, change to 12-pitch, and print indented material with a completely different look than the main text (see Figure 1).

Directory and Kill Commands

SuperScript gives you many clever printing options, but the special commands available during text entry/editing will be used even more often, perhaps. These are the Directory and Kill commands, and add immense ease-of-use and power to Scripsit.

You can see the disk directory at any time by simply pressing the BREAK key (to put you in command mode) and typing "?D." The directory will replace the text on screen and will show all files with regular and "invisible" attributes (but not "system" files), plus an indication of the amount of disk space available in grans. Great, you say, but what happens to the text that was replaced by the directory? Press either the space bar or the ENTER key and the directory disappears, to be replaced by your text—even the cursor is just where you left it.

The combination of the Kill and Directory commands alone make SuperScript worth its price.

Killing files without leaving Scripsit is even simpler than killing them from DOS. Just enter the command mode by pressing BREAK, then type "K filename." The disk whirs in the drive and it's done. The beauty of this command is that you can make room for your text to be stored on disk without the Scripsit Catch-22: with unmodified Scripsit, you must exit the program—and thus lose the text—to make room on the disk for the copy you just lost! The combination of the Kill and Directory commands alone make *SuperScript* worth its price.

When Radio Shack first released Scripsit, there was a tremendous flurry of interest among business people. The furor was quickly dampened, however, when people discovered that the limitations of Scripsit were simply unacceptable in a business environment. Had *SuperScript* been available at that time—and recommended by Radio Shack personnel—sales to the business and professional communities would have increased significantly.

Disadvantages

But is everything about *SuperScript* just peaches-and-cream? Well, almost. There are some areas that could stand improvement. The program documentation, while very complete, is not easily digestible by computer novices and needs to be read a couple of times before it can be fully understood. I would dearly love to have seen included a separate card with a summary of the new commands and control characters. A set of stickers to use in labelling the new control keys would also be nice. It's little touches like these—however trivial—that make life easier for the end-user of a fine product like *SuperScript*, especially if that end-user is not a computer hobbyist.

Summary

All told, *SuperScript* represents a very significant improvement over Radio Shack's unmodified Scripsit. But even amid this wealth of added capabilities, there have been a few perfectionists who still suffer from the dread "if only..." syndrome. To satisfy them, Acorn Software will be releasing an expanded (and more expensive) version of *SuperScript*. It should be available even as you read this review, and will include user-defined special characters and control codes; variable repeat speed; automatic saving of the window width, tab stops, and paragraph indentation settings; an indication of how many grans of disk space will be needed to save the current text; and the ability to load both Scripsit and the desired text file directly from DOS by typing "SCRIPT filename."

Additionally, Acorn will include a separate program titled, appropriately, "OOPS." This little gem will allow you to recover all or most of your Scripsit text after you accidentally press the reset button, issue the "END" command, or if the system "hangs up" for just about any reason before saving your copy on disk.

If you don't need the extra bells and whistles, the original version of *SuperScript* continues to be a super bargain at $50.00. On the other hand, the combination of Radio Shack's Scripsit and Acorn Software's expanded *SuperScript* promises to be a word processing system that will be hard to beat at any price. □

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CARD GAMES

NEW

BACCARAT (Atari only) **Price: $18.95 Cassette/$22.95 Diskette**
This is the European card game which is the favorite of the Monte Carlo jet set. Imagine yourself at the gaming table with 007 to your left and Goldfinger to your right. Learn and play BACCARAT at your leisure on the Atari. Contains full high resolution color graphics and matching sound. Runs in 16K. Requires one joystick.

NEW

GIN RUMMY (Apple only) **Price: $18.95 Cassette/$22.95 Diskette**
This is the best micro computer implementation of GIN RUMMY existing. The computer plays exceptionally well, and the HIRES graphics are superb. What else can be said?

POKER PARTY (Available for all computers) **Price: $17.95 Cassette/$21.95 Diskette**
POKER PARTY is a draw poker simulation based on the book, POKER, by Oswald Jacoby. This is the most comprehensive version available for microcomputers. The party consists of yourself and six other (computer) players. Each of these players (you will get to know them) has a different personality in the form of a varying propensity to bluff or fold under pressure. Practice with POKER PARTY before going to that expensive game tonight! Apple cassette and diskette versions require a 32 K (or larger) Apple II.

NEW

GO FISH (Available for all computers) **Price: $14.95 Cassette/$18.95 Diskette**
GO FISH is a classic children's card game. The opponent is a friendly computer with user inputs that are simple enough for small children to easily master. The Apple and Atari versions employ high resolution graphics for the display of hands. A must for children!

THOUGHT PROVOKERS

MANAGEMENT SIMULATOR (Atari, North Star, OSBORNE and CP/M only) **Price: $19.95 Cassette**
$23.95 Diskette
This program is both an excellent teaching tool as well as a stimulating intellectual game. Based upon similar games played at graduate business schools, each player or team controls a company which manufacturers three products. Each player attempts to outperform his competitors by setting selling prices, production volumes, marketing and design expenditures etc. The most successful firm is the one with the highest stock price when the simulation ends.

FLIGHT SIMULATOR (Available for all computers) **Price: $17.95 Cassette/$21.95 Diskette**
A realistic and extensive mathematical simulation of take-off, flight and landing. The program utilizes aerodynamic equations and the characteristics of a real airfoil. You can practice instrument approaches and navigation using radials and compass headings. The more advanced flyer can also perform loops, half-rolls and similar aerobatic maneuvers. Although this program does not employ graphics, it is exciting and very addictive. See the software review in COMPUTRONICS. Runs in 16K Atari.

VALDEZ (Available for all computers) **Price: $15.95 Cassette/$19.95 Diskette**
VALDEZ is a computer simulation of supertanker navigation in the Prince William Sound/Valdez Narrows region of Alaska. Included in this simulation is a realistic and extensive 256 × 256 element map, portions of which may be viewed using the ship's alphanumeric radar display. The motion of the ship itself is accurately modelled mathematically. The simulation also contains a model for the tidal patterns in the region, as well as other traffic (outgoing tankers and drifting icebergs). Chart your course from the Gulf of Alaska to Valdez Harbor! See the software reviews in 80 Software Critique and Personal Computing.

BACKGAMMON 2.0 (Atari, North Star, OSBORNE and CP/M only) **Price: $14.95 Cassette/$18.95 Diskette**
This program tests your backgammon skills and will also improve your game. A human can compete against a computer or against another human. The computer can even play against itself. Either the human or the computer can double or generate dice rolls. Board positions can be created or saved for replay. BACKGAMMON 2.0 plays in accordance with the official rules of backgammon and is sure to provide many fascinating sessions of backgammon play.

CHESS MASTER (North Star and TRS-80 only) **Price: $19.95 Cassette/$23.95 Diskette**
This complete and very powerful program provides five levels of play. It includes castling, en passant captures and the promotion of pawns. Additionally, the board may be preset before the start of play, permitting the examination of "book" plays. To maximize execution speed, the program is written in assembly language (by SOFTWARE SPECIALISTS of California). Full graphics are employed in the TRS-80 version, and two widths of alphanumeric display are provided to accommodate North Star users. See review in onComputing.

NEW

SUPER SUB CHASE (Atari only) **Price: $19.95 Cassette/$23.95 Diskette**
SUPER SUB CHASE simulates a search and destroy mission. Set your course and keep an eye on the sonar readings as you hunt for the hidden submarine. Set the depth charge explosion depth and watch them sink towards the sub. This is an addictive game which takes advantage of the Atari's graphics and sound capabilities. One or two players. Joystick(s) required.

FOREST FIRE! (Atari only) **Price: $15.95 Cassette/$19.95 Diskette**
Using excellent graphics and sound effects, this simulation puts you in the middle of a forest fire. Your job is to direct operations to put out the fire while compensating for changes in wind, weather and terrain. Not protecting valuable structures can result in startling penalties. Life-like variables are provided to make FOREST FIRE! very suspenseful and challenging. No two games have the same setting and there are 3 levels of difficulty.

BLACK HOLE (Apple only) **Price: $14.95 Cassette/$18.95 Diskette**
This is an exciting graphical simulation of the problems involved in closely observing a black hole with a space probe. The object is to enter and maintain, for a prescribed time, an orbit close to a small black hole. This is to be achieved without coming so near the anomaly that the tidal stress destroys the probe. Control of the craft is realistically simulated using side jets for rotation and main thrusters for acceleration. This program employs Hi-Res graphics and is educational as well as challenging.

NEW

SPACE EVACUATION! (Apple, Atari and TRS-80 only) **Price: $15.95 Cassette/$19.95 Diskette**
Can you colonize the galaxy and evacuate the Earth before the sun explodes? Your computer becomes the ship's computer as you explore the universe to relocate millions of people. This simulation is particularly interesting as it combines many of the exciting elements of classic space games with the mystery challenge of ADVENTURE.

MONARCH (Atari only) **Price: $11.95 Cassette/$15.95 Diskette**
MONARCH is a fascinating economic simulation requiring you to survive an 8-year term as your nation's leader. You determine the amount of acreage devoted to industrial and agricultural use, how much food to distribute to the populace and how much should be spent on pollution control. You will find that all decisions involve a compromise and that it is not easy to make everyone happy. Runs in 16K Atari.

CHOMPELO (Atari only) **Price: $11.95 Cassette/$15.95 Diskette**
CHOMPELO is really two challenging games in one. One is similar to NIM; you must bite off part of a cookie, but avoid taking the poisoned portion. The other game is the popular board game REVERSI. It fully uses the Atari's graphics capability, and is hard to beat. This package will run on a 16K system.

SPACE LANES (Available for all computers) **Price: $10.95 Cassette/$14.95 Diskette**
SPACE LANES is a simple but exciting space transportation game which involves up to four players (including the computer). The object is to form and expand space transportation companies in a competitive environment. The goal is to amass more net worth than your opponent. The economics include stock purchases and company mergers. Watch your wealth grow!

AVAILABILITY

DYNACOMP software is supplied with complete documentation containing clear explanations and examples. Unless otherwise specified, all programs will run within 16K program memory space (ATARI requires 24K). Except where noted, programs are available on ATARI, PET, TRS-80 (Level II) and Apple (Applesoft) cassette and diskette as well as North Star single density (double density compatible) diskette. Additionally, most programs can be obtained on standard (IBM 3740 single density/double density compatible format) 8" CP/M floppy disks for systems running under MBASIC (for example, Altos, Xerox 820 and many others). 5¼" CP/M diskettes are available for the North Star and Osborne computer systems.

**ATARI, PET/CBM, NORTH STAR, CP/M, IBM, OSBORNE and XEROX are registered tradenames and/or trade marks.*

***Except where noted, all TRS-80 Model I software is available on cassette (only) for the TRS-80 Model III. Exceptions: VALDEZ, CRIBBAGE, GRAFIX, CHESSMASTER. TRS-80 diskettes are not supplied with either DOS or BASIC.*

****For most North Star disk-based systems. DYNACOMP presently does not support the new North Star Advantage.*

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STARTREK 3.2 (Available for all computers) **Price: $11.95 Cassette/$15.95 Diskette**
This is the classic Startrek simulation, but with several new features. For example, the Klingons now shoot at the Enterprise without warning while also attacking starbases in other quadrants. The Klingons also attack with both light and heavy cruisers and move when shot at! The situation is hectic when the Enterprise is besieged by three heavy cruisers and a starbase S.O.S. is received! The Klingons get even! See the software reviews in A.N.A.L.O.G., 80 Software Critique and Game Merchandising.

NEW

LIL' MEN FROM MARS (Atari only) **Price: $19.95 Cassette/$23.95 Diskette**
Defend yourself! The little men from Mars are out to get you if you don't get them first. This is a hilarious high resolution animated graphics (arcade) game which exercises much of the Atari's power. Requires one joystick.

SPACE TILT (Apple and Atari only) **Price: $10.95 Cassette/$14.95 Diskette**
Use the game paddles to tilt the plane of the TV screen to "roll" a ball into a hole in the screen. Sound simple? Not when the hole gets smaller and smaller! A built-in timer allows you to measure your skill against others in this habit-forming action game.

NEW

ESCAPE FROM VOLANTIUM (Atari only) **Price: $15.95 Cassette/$19.95 Diskette**
Bring the action and excitement of an arcade into your home with ESCAPE FROM VOLANTIUM! To escape you must maneuver your space ship around obstacles and laser blast the dragon (without being eaten). If he is killed with a direct shot (not just a leg lopped off), a door opens to the outside. However, the door does not stay open indefinitely. If you fail to escape in time, the door closes and a new dragon appears. Sometimes you can smash through the door by repeatedly chipping away at it. Other times it is impervious. At the higher levels of play more obstacles and dragons appear, adding to the excitement. Uses high resolution graphics and sound. Runs in 16K.

ALPHA FIGHTER (Atari only) **Price: $13.95 Cassette/$17.95 Diskette**
Two excellent graphics and action programs in one! ALPHA FIGHTER requires you to destroy the alien starships passing through your sector of the galaxy. ALPHA BASE is in the path of an alien UFO invasion; let five UFO's get by and the game ends. Both games require the joystick and get progressively more difficult the higher you score! ALPHA FIGHTER will run on 16K systems.

THE RINGS OF THE EMPIRE (Atari only) **Price: $15.95 Cassette/$19.95 Diskette**
The empire has developed a new battle station protected by rotating rings of energy. Each time you blast through the rings and destroy the station, the empire develops a new station with more protective rings. This exciting game runs on 16K systems, employs extensive graphics and sound and can be played by one or two players.

INTRUDER ALERT (Atari only) **Price: $15.95 Cassette/$19.95 Diskette**
This is a fast paced graphics game which places you in the middle of the "Dreadstar" having just stolen its plans. The droids have been alerted and are directed to destroy you at all costs. You must find and enter your ship to escape with the plans. Five levels of difficulty are provided. INTRUDER ALERT requires a joystick and will run on 16K systems.

NEW

MIDWAY (Atari only) **Price: $14.95 Cassette/$18.95 Diskette**
MIDWAY is an exciting extension of the game of Battleship. It mixes the challenges of strategy and chance. Your opponent can be another human or the computer. Color graphics and sound are both included. Runs in 16K.

TRIPLE BLOCKADE (Atari only) **Price: $14.95 Cassette/$18.95 Diskette**
TRIPLE BLOCKADE is a two-to-three player graphics and sound action game. It is based on the classic video arcade game which millions have enjoyed. Using the Atari joysticks, the object is to direct your blockading line around the screen without running into your opponent(s). Although the concept is simple, the combined graphics and sound effect lead to "high anxiety".

GAMES PACK I (Available for all computers) **Price: $10.95 Cassette/$14.95 Diskette**
GAMES PACK I contains the classic computer games of BLACKJACK, LUNAR LANDER, CRAPS, HORSERACE, SWITCH and more. These games have been combined into one large program for ease in loading. They are individually accessed by a convenient menu. This collection is worth the price just for the DYNACOMP version of BLACKJACK.

GAMES PACK II (Available for all computers) **Price: $10.95 Cassette/$14.95 Diskette**
GAMES PACK II includes the games CRAZY EIGHTS, JOTTO, ACEY-DUCEY, LIFE, WUMPUS and others. As with GAMES PACK I, all the games are loaded as one program and are called from a menu. You will particularly enjoy DYNACOMP's version of CRAZY EIGHTS.

Why pay $7.95 or more per program when you can buy a DYNACOMP collection for just $10.95?

MOON PROBE (Atari and North Star only) **Price: $11.95 Cassette/$15.95 Diskette**
This is an extremely challenging "lunar lander" program. The user must drop from orbit to land at a predetermined target on the moon's surface. You control the thrust and orientation of your craft plus direct the rate of descent and approach angle. Runs in 16K Atari.

SPACE TRAP (Atari only, 16K) **Price: $14.95 Cassette/$18.95 Diskette**
This galactic "shoot'em up" arcade game places you near a black hole. You control your spacecraft using the joystick and attempt to blast as many of the alien ships as possible before the black hole closes about you.

NEW

CHIRP INVADERS (PET/CBM only) **Price: $14.95 Cassette/$18.95 Diskette**
CHIRP INVADERS is an addictive game using action graphics. A Federation space station must be reached before the Chirps conquer the Earth. Stationary obstacles, moving meteors, and the attacking Chirps must all be avoided for a successful journey. Good luck.

ADVENTURE

CRANSTON MANOR ADVENTURE (North Star and CP/M only) **Price: $19.95 Diskette**
At last! A comprehensive Adventure game for North Star and CP/M systems. CRANSTON MANOR ADVENTURE takes you into mysterious CRANSTON MANOR where you attempt to gather fabulous treasures. Lurking in the manor are wild animals and robots who will not give up the treasures without a fight. The number of rooms is greater and the associated descriptions are much more elaborate than the current popular series of Adventure programs, making this game the top in its class. Play can be stopped at any time and the status stored on diskette. Not available in 5¼" CP/M format.

GUMBALL RALLY ADVENTURE (North Star only, 48K) **Price: $21.95 Diskette**
Take part in this outlaw race from the east coast to the west coast. The goal is to find your way to the finish line while maintaining the highest possible speed. You may choose one of five cars available at the garage. The choice will affect your speed and range. Remember to take spare parts and don't get caught speeding!

NEW

UNCLE HARRY'S WILL (North Star only, 40K) **Price: $24.95 Diskette**
Uncle Harry has died and has left you everything. However, he has neglected to mention where everything is! Instead, his will consists of a poem which contains clues. You will have to travel all over the United States both by car and on foot to solve the puzzle, and there are over 300 locations to probe. Be careful and watch out for red herrings!

SPEECH SYNTHESIS

DYNACOMP is now distributing the new and revolutionary TYPE-'N-TALK^{TM} (TNT) speech synthesizer from Votrax. Simply connect TNT to your computer's serial interface, enter text from the keyboard and hear the words spoken. TNT is the easiest-to-program speech synthesizer on the market. It uses the least amount of memory and provides the most flexible vocabulary available anywhere!

List price $375. DYNACOMP'S price $319.95 plus $5.00 for shipping and handling.

TALK TO ME (T'N'T Atari only, 24K) **Price: $14.95 Cassette/$18.95 Diskette**
This program presents a superb tutorial on speech synthesis using the Atari 800 and TYPE 'N TALK^{TM}. TALK TO ME will illustrate normal word generation as well as phoneme generation. The documentation includes many helpful programming tips. TALK TO ME has been demonstrated on network (CBS) TV!

MISCELLANEOUS

CRYSTALS (Atari only) **Price: $ 9.95 Cassette/$13.95 Diskette**
A unique algorithm randomly produces fascinating graphics displays accompanied with tones which vary as the patterns are built. No two patterns are the same, and the combined effect of the sound and graphics are mesmerizing. CRYSTALS has been used in local stores to demonstrate the sound and color features of the Atari. Runs in 16K Atari.

NORTH STAR SOFTWARE EXCHANGE (NSSE) LIBRARY
DYNACOMP now distributes the 23 volume NSSE library. These diskettes each contain many programs and offer an outstanding value for the purchase price. They should be part of every North Star user's collection. Call or write DYNACOMP for details regarding the contents of the NSSE collection.

Price: $9.95 each/$7.95 each (4 or more)
The complete collection may be purchased for $149.95

BUSINESS and UTILITIES

NEW

MAILMASTER (Atari diskette only) **Price: $39.95 Diskette**

MAILMASTER is a very versatile software package for managing and manipulating mail lists and mini data bases. Each disk can hold over 700 customer entries containing name, address, three 3-letter key words and a phone number. The display is marked so that entries may be made and edited with ease. The status (e.g., disk space left, options, etc.) is shown at all times. Labels may be printed 1,2 or 3 up, and all sorting (zip code and alphabetic) is performed by a fast machine language program.

PERSONAL FINANCE SYSTEM (Atari and North Star only) **Price: $39.95 Diskette**

PFS is a single diskette, menu-oriented system composed of ten different programs. Besides recording your expenses and tax deductible items, PFS will sort and summarize expenses by payee, and display information on expenditures by any of 26 user defined codes by month or by payee. PFS will even produce monthly bar graphs of your expenses by category! This powerful package requires only one disk drive, minimal memory (24K Atari, 32K North Star) and will store up to 600 records per disk (and over 1000 records per disk by making a few simple changes to the programs). You can record checks plus cash expenses so that you can finally see where your money goes and eliminate guesswork and tedious hand calculations. Contains high speed machine language sort. PFS has been demonstrated on network (CBS) TV!

FAMILY BUDGET (Apple and Atari only) **Price: $34.95 Diskette**

FAMILY BUDGET is a very convenient financial record-keeping program. You will be able to keep track of cash and credit expenditures as well as income on a daily basis. You can record tax deductible items and charitable donations. FAMILY BUDGET also provides a continuous record of all credit transactions. You can make daily cash and charge entries to any of 21 different expense accounts as well as to 5 payroll and tax accounts. Data are easily retrieved giving the user complete control over an otherwise complicated (and unorganized!) subject.

INTELINK (Atari only) **Price: $49.95 Diskette**

This software package contains a menu-driven collection of programs for facilitating efficient two-way communications through a full duplex modem (required for use). In one mode of operation you may connect to a data service (e.g., The SOURCE or MicroNet) and quickly load data such as stock quotations onto your diskette for later viewing. This greatly reduces "connect time" and thus the service charge. You may also record the complete contents of a communications session. Additionally, programs written in BASIC, FORTRAN, etc. may be built off-line using the support text editor and later "uploaded" to another computer, making the Atari a *very* smart terminal. Even Atari BASIC programs may be uploaded. Further, a command file may be built off-line and used later as controlling input for a time-share system. That is, you can set up your sequence of time-share commands and programs, and the Atari will transmit them as needed; batch processing. All this adds up to saving both connect time and your time.

TEXT EDITOR II (CP/M) **Price: $29.95 Diskette/$33.45 Disk**

This is the second release version of DYNACOMP's popular TEXT EDITOR I and contains many new features. With TEXT EDITOR II you may build text files in chunks and assemble them for later display. Blocks of text may be appended, inserted or deleted. Files may be saved on disk/diskette in right justified/centered format to be later printed by either TEXT EDITOR II or the CP/M ED facility. Futher, ASCII CP/M files (including BASIC and assembly language programs) may be read by the editor and processed. In fact, text files can be built using ED and later formatted using TEXT EDITOR II. All in all, TEXT EDITOR II is an inexpensive, easy to use, but very flexible editing system.

NEW

PAYFIVE (Apple II plus diskette, two drives required) **Price: $149.95**

This is an enormously flexible employee payroll system with extraordinarily good human engineering features. PAYFIVE prints checks and compiles the required federal, state and local forms for up to 148 employees. The pay methods may be hourly, salary, commission or any combination. There are multiple options for pay periods, and they also can be used in any combination. PAYFIVE includes *many* other features and comes extremely well documented with a 200 page manual. The manual may be purchased separately for $30, and that payment later applied to the software purchase.

SHOPPING LIST (Atari only) **Price: $12.95 Cassette/$16.95 Diskette**

SHOPPING LIST stores information on items you purchase at the supermarket. Before going shopping, it will remind you of all the things you might need, and then display (or optionally print) your shopping list and the total cost. Adding, deleting, changing and storing data is very easy. Runs with 16K.

TAX OPTIMIZER (North Star only) **Price: $59.95 Diskette**

The TAX OPTIMIZER is an easy-to-use, menu oriented software package which provides a convenient means for analyzing various income tax strategies. The program is designed to provide a quick and easy data entry. Income tax is computed by all tax methods (regular, income averaging, maximum and alternate minimum tax). The user may immediately observe the tax effect of critical financial decisions. TAX OPTIMIZER has been thoroughly field tested in CPA offices and comes complete with the current tax tables in its data files. TAX OPTIMIZER is tax deductible!

NEW

UTIL (Apple only, 48K) **Price: $19.95 Diskette**

UTIL is a disk-oriented utility system which permits examining and changing of the contents of DOS 3.2 and 3.3 diskettes at the bit (nibble or byte) level. With UTIL you can easily examine the contents of a diskette sector by sector, restructure the sector pointers, reallocate sectors (e.g. bad sectors may be "hidden"), and perform many other sophisticated operations. For the experienced programmer.

NEW

TURNKEY AND MENU (Atari only) **Price: $17.95 Diskette**

TURNKEY is a utility program which allows you to create autoboot/autorun diskettes easily. Simply load and run TURNKEY, load the program diskette to be modified, and answer the questions! The TURNKEY diskette also comes with DOS 2.0 and includes another program, MENU. MENU lists the contents of your diskette alphabetically, and permits the running of any BASIC program on the diskette by typing a single key. TURNKEY and MENU provide you with the ability to run any program on your diskette by simply turning on the computer and pressing a single key.

NEW

STOCKAID (Atari only) **Price: $29.95 Diskette**

STOCKAID provides a powerful set of tools for stock market analysis. With STOCKAID you can display point and figure charts, as well as bar charts with oscillators. You can also examine long term moving averages and on-balance volume features. STOCKAID allows you to input daily data with a single diskette storage capability of 239 days × 16 stocks. Included are stock dividend and split adjustment capabilities. A very professional package!

NEW

SHAPE MAGICIAN (Apple II, 48K, diskette only) **Price: $29.95**

At last! An utility for painlessly creating graphics shapes for the Apple. Create, edit and save up to 30 shapes which can then be used to develop arcade games or to simply enhance your programs. Add that professional touch!

EDUCATION

HODGE PODGE (Apple only, 48K Applesoft or Integer BASIC) **Price: $14.95 Cassette/$18.95 Diskette**

Let HODGE PODGE be your child's teacher. Pressing any key on your Apple will result in a different and intriguing "happening" related to the letter or number of the chosen key. The program's graphics, color and sound are a delight for children from ages 1½ to 7. HODGE PODGE is a non-intimidating teaching device which brings a new dimension to the use of computers in education. See the excellent reviews of this very popular program in INFOWORLD and SOFTALK.

NEW

TEACHER'S AIDE (Atari only) **Price: $13.95 Cassette/$17.95 Diskette**

TEACHER'S AIDE consists of three basic modules contained in one program. The first module provides addition and subtraction exercises of varying levels of difficulty. The second module consists of multiplication problems in which the student may be tested both on the final answer and/or on the subtotal answers in the long hand procedure. Several levels of complexity are provided here as well. The third module consists of division problems; one particularly nice feature of the division module is that the long hand division steps can be displayed along with the remainder in order to clearly demonstrate the procedure by which the remainder is derived. Using TEACHER'S AIDE is not merely a drill, but rather a learning experience.

NEW

PHARMACOLOGY UPDATE (PET only) **Price: $149.95 Cassette/$153.95 Diskette**

This is DYNACOMP's first educational software entry for the medical profession (more are coming!). PHARMACOLOGY UPDATE was written by a R.N. as a masters project, with the aid of a practicing pharmacologist and an electronics instructor. This package comes in two parts. The first part is a 200 page manual which is divided into 10 sections. Each of these sections provides both concise information and probing questions. The second part consists of 10 programs that are keyed to the text and which test the degree of your understanding of the text material. This package has great educational value for the beginning student as well as the professional interested in an efficient way to review and update his or her knowledge.

ORDERING INFORMATION

All orders are processed and shipped within 48 hours. Please enclose payment with order and include the appropriate computer information. If paying by VISA or Master Card, include all numbers on card. Purchase orders accepted.

Shipping and Handling Charges
Within North America: Add $2.00
Outside North America: Add 15% (Air Mail)

Delivery
All orders (excluding books) are sent First Class.

Quantity Discounts
Deduct 10% when ordering 3 or more programs. Dealer discount schedules are available upon request.

8" CP/M Disks
Add $2.50 to the listed diskette price for each 8" floppy disk (IBM soft sectored CP/M format). Programs run under Microsoft MBASIC or BASIC-80.

5¼" CP/M Disks
All software available on 8" CP/M disks is also available on 5¼" disks, North Star and Osborne format.

Ask for **DYNACOMP** programs at your local software dealer. Write for detailed descriptions of these and other programs from **DYNACOMP**.

DYNACOMP, Inc. (Dept. C)
1427 Monroe Avenue
Rochester, New York 14618
24 hour order phone: (716)442-8731 recording
Office phone (9AM-5PM EST): (716)442-8960

New York State residents please add 7% NYS sales tax.

STATISTICS and ENGINEERING

DIGITAL FILTER (Available for all computers) **Price: $39.95 Cassette/$43.95 Diskette**

DIGITAL FILTER is a comprehensive data processing program which permits the user to design his own filter function or choose from a menu of filter forms. The filter forms are subsequently converted into non-recursive convolution coefficients which permit rapid data processing. In the explicit design mode the shape of the frequency transfer function is specified by directly entering points along the desired filter curve. In the menu mode, ideal low pass, high pass and bandpass filters may be approximated to varying degrees according to the number of points used in the calculation. These filters may optionally also be smoothed with a Hanning function. In addition, multi-stage Butterworth filters may be selected. Features of DIGITAL FILTER include plotting of the data before and after filtering, as well as display of the chosen filter functions. Also included are convenient data storage, retrieval and editing procedures.

DATA SMOOTHER (Not available for Atari) **Price: $19.95 Cassette/$23.95 Diskette**

This special data smoothing program may be used to rapidly derive useful information from noisy business and engineering data which are equally spaced. The software features choice in degree and range of fit, as well as smoothed first and second derivative calculation. Also included is automatic plotting of the input data and smoothed results.

FOURIER ANALYZER (Available for all computers) **Price: $19.95 Cassette/$23.95 Diskette**

Use this program to examine the frequency spectra of limited duration signals. The program features automatic scaling and plotting of the input data and results. Practical applications include the analysis of complicated patterns in such fields as electronics, communications and business.

TFA (Transfer Function Analyzer) **Price: $19.95 Cassette/$23.95 Diskette**

This is a special software package which may be used to evaluate the transfer functions of systems such as hi-fi amplifiers and filters by examining their response to pulsed inputs. TFA is a major modification of FOURIER ANALYZER and contains an engineering-oriented decibel versus log-frequency plot as well as data editing features. Whereas FOURIER ANALYZER is designed for educational and scientific use, TFA is an engineering tool. Available for all computers.

HARMONIC ANALYZER (Available for all computers) **Price: $24.95 Cassette/$28.95 Diskette**

HARMONIC ANALYZER was designed for the spectrum analysis of repetitive waveforms. Features include data file generation, editing and storage/retrieval as well as data and spectrum plotting. One particularly unique facility is that the input data need not be equally spaced or in order. The original data is sorted and a cubic spline interpolation is used to create the data file required by the FFT algorithm.

FOURIER ANALYZER, TFA and HARMONIC ANALYZER may be purchased together for a combined price of $49.95 (three cassettes) and $59.95 (three diskettes).

REGRESSION I (Available for all computers) **Price: $19.95 Cassette/$23.95 Diskette**

REGRESSION I is a unique and exceptionally versatile one-dimensional least squares "polynomial" curve fitting program. Features include very high accuracy; an automatic degree determination option; an extensive internal library of fitting functions; data editing; automatic data, curve and residual plotting; a statistical analysis (eg: standard deviation, correlation coefficient, etc.) and much more. In addition, new fits may be tried without reentering the data. REGRESSION I is certainly the cornerstone program in any data analysis software library.

REGRESSION II (PARAFIT) (Available for all computers) **Price: $19.95 Cassette/$23.95 Diskette**

PARAFIT is designed to handle those cases in which the parameters are imbedded (possibly nonlinearly) in the fitting function. The user simply inserts the functional form, including the parameters (A(1), A(2), etc.) as one or more BASIC statement lines. Data, results and residuals may be manipulated and plotted as with REGRESSION I. Use REGRESSION I for polynomial fitting, and PARAFIT for those complicated functions.

MULTILINEAR REGRESSION (MLR) (Available for all computers) **Price: $24.95 Cassette/$28.95 Diskette**

MLR is a professional software package for analyzing data sets containing two or more linearly independent variables. Besides performing the basic regression calculation, this program also provides easy to use data entry, storage, retrieval and editing functions. In addition, the user may interrogate the solution by supplying values for the independent variables. The number of variables and data size is limited only by the available memory.

REGRESSION I, II and MULTILINEAR REGRESSION may be purchased together for $51.95 (three cassettes) or $63.95 (three diskettes).

ANOVA (Not available on Atari cassette or for PET/CBM) **Price: $39.95 Cassette/$43.95 Diskette**

In the past the ANOVA (analysis of variance) procedure has been limited to the large mainframe computers. Now DYNACOMP has brought the power of this method to small systems. For those conversant with ANOVA, the DYNACOMP software package includes the 1-way, 2-way and N-way procedures. Also provided are the Yates 2^{K-P} factorial designs. For those unfamiliar with ANOVA, do not worry. The accompanying documentation was written in a tutorial fashion (by a professor in the subject) and serves as an excellent introduction to the subject. Accompanying ANOVA is a support program for building the data base. Included are several convenient features including data editing, deleting and appending.

BASIC SCIENTIFIC SUBROUTINES, Volumes 1 and 2 (Not available for Atari)

DYNACOMP is the exclusive distributor for the software keyed to the popular texts *BASIC SCIENTIFIC SUBROUTINES, Volumes 1 and 2* by F. Ruckdeschel (see advertisements in BYTE magazine). These subroutines have been assembled according to chapter. Included with each collection is a menu program which selects and demonstrates each subroutine.

Volume 1
Collection #1: Chapters 2 and 3 - Data and function plotting; complex variables and functions.
Collection #2: Chapter 4 - Extended matrix and vector operations.
Collection #3: Chapters 5 and 6 - Random number generators (Poisson, Gaussian, etc.); series approximations.
Price per collection: $14.95 Cassette/$18.95 Diskette
All three collections are available for $39.95 (three cassettes) and $49.95 (three diskettes).

Volume 2
Collection #1: Chapter 1 - Linear, polynomial, multidimensional, parametric least squares.
Collection #2: Chapter 2 - Series approximation techniques (economization, inversion, reversion, shifting, etc.).
Collection #3: Chapter 3 - Functional approximations by iteration and recursion.
Collection #4: Chapter 4 - CORDIC approximations to trigonometric, hyperbolic, exponential and logarithmic functions.
Collection #5: Chapter 5 - Table interpolation, differentiation and integration (Newton, LaGrange, splines).
Collection #6: Chapter 6 - Methods for finding the real roots of functions.
Collection #7: Chapter 7 - Methods for finding the complex roots of functions.
Collection #8: Chapter 8 - Optimization by steepest descent.
Price per collection: $14.95 Cassette/$18.95 Diskette
All eight collections are available for $99.95 (eight cassettes) and $129.95 (eight diskettes).

Because the texts are a vital part of the documentation, *BASIC SCIENTIFIC SUBROUTINES, Volumes 1 and 2* are available from DYNACOMP:

BASIC SCIENTIFIC SUBROUTINES, Vol 1 (319 pages): $19.95 + 75¢ postage
BASIC SCIENTIFIC SUBROUTINES, Vol 2 (790 pages): $23.95 + $1.50 postage

See reviews in KILOBAUD and Dr. Dobbs.

NEW

SOFTNET (Apple II 48K, diskette only) **Price $129.95**

SOFTNET may be used to create models of liquid pipeline systems to evaluate their flow performance. Up to 150 nodes with up to 150 connecting elements may be simulated, and models may be combined to form yet larger models. If you are involved in water distribution systems, chemical fluid flow problems, building plumbing, or similar situations, this is an ideal analysis tool.

ACTIVE CIRCUIT ANALYSIS (ACAP) (48K Apple only) **Price: $25.95 Cassette/$29.95 Diskette**

ACAP is the analog circuit designer's answer to LOGIC SIMULATOR. With ACAP you may analyze the response of an active or passive component circuit (e.g., a transistor amplifier, band pass filter, etc.). The circuit may be probed at equal steps in frequency, and the resulting complex (i.e., real and imaginary) voltages at each component juncture examined. By plotting the magnitude of these voltages, the frequency response of a filter or amplifier may be completely determined with respect to both amplitude and phase. In addition, ACAP prints a statistical analysis of the range of voltage responses which result from tolerance variations in the components. ACAP is easy to learn and use. Simply describe the circuit in terms of the elements and their placement, and execute. Circuit descriptions may be saved onto cassette or diskette to be recalled at a later time for execution or editing. ACAP should be part of every circuit designer's program library.

LOGIC SIMULATOR (Apple only; 48K RAM) **Price: $24.95 Cassette/$28.95 Diskette**

With LOGIC SIMULATOR you may easily test your complicated digital logic design with respect to given set of inputs to determine how well the circuit will operate. The elements which may be simulated include multiple input AND, OR, NOR, EXOR, EXNOR and NAND gates, as well as inverters, J-K and D flip-flops, and one-shots. The response of the system is available every clock cycle. Inputs may be clocked in with varying clock cycle lengths/displacements and delays may be introduced to probe for glitches and race conditions. At the user's option, a timing diagram for any given set of nodes may be plotted using HIRES graphics. Save your breadboarding until the circuit is checked by LOGIC SIMULATOR.

NEW

NUMBERKRUNCHER (TRS-80 only) **Price: $69.95 Cassette/$73.95 Diskette**

This program is the most complete numerical analysis system available for the TRS-80. It can handle up to 255 data sets, each set having a six character name. It includes complete data editing facilities and convenient data input/output capability. The analyses available are multiple linear regression and correlation determination of residuals, data transformations and extensive graphics generation, including axis naming, and more. The supporting documentation is extremely well written and well organized, and includes appendices which describe the numerical procedures used in the program.

NEW

STATSORT (TRS-80 only) **Price: $39.95 Cassette/$43.95 Diskette**

STATSORT consists of several menu selected programs which allow the user to create (build, edit, merge), format and print files, (machine) sort them on any field, and numerically analyze (maximum, minimum, average, variance, standard deviation) tabulated data. STATSORT is well documented and easy to use. The cassette version can also be employed to create a data type which can be read by the Radio Shack Advanced Statistical Package.

NEW

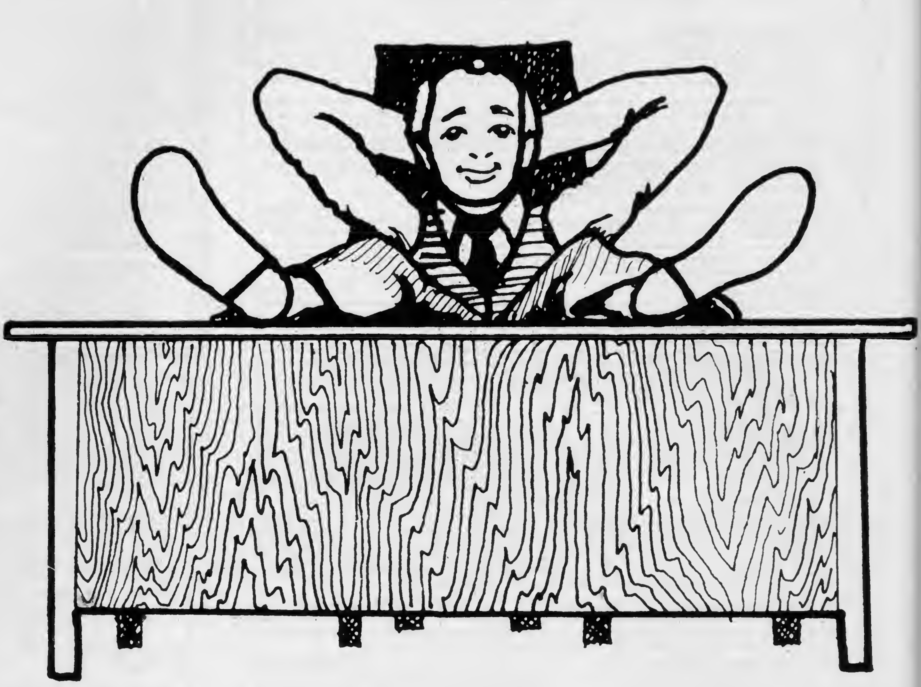
STATTEST (TRS-80 only) **Price: $19.95 Cassette/$23.95 Diskette**

This is a statistical inference package which helps you make wise decisions in the face of uncertainty. In an interactive fashion you can build and edit data files and test the differences in means, variances and proportions. STATTEST will also perform data analysis as well as do linear correlation and regression. This menu-directed statistical workhorse is rounded out with a chi-square contingency test and a (uniform and normal) random sample generator. The documentation is written by a college professor who guides you through the various tests.

ABOUT DYNACOMP

DYNACOMP is a leading distributor of small system software with sales spanning the world (currently in excess of 50 countries). During the past three years we have greatly enlarged the DYNACOMP product line, but have maintained and improved our high level of quality and customer support. The achievement in quality is apparent from our many repeat customers and the software reviews in such publications as COMPUTRONICS, 80 Software Critique, A.N.A.L.O.G., Softalk, Creative Computing and Kilobaud. DYNACOMP software has also been chosen for demonstration on network television. Our customer support is as close as your phone. It is always friendly. The staff is highly trained and always willing to discuss products or give advice.

CIRCLE 130 ON READER SERVICE CARD



Lazy Writer

George Bond

creative computing
SOFTWARE PROFILE

Name: Lazy Writer
Type: Word Processing
System: 32K Model I TRS-80, Disk Drive
Format: Disk
Language: Machine Language
Summary: Very easy to use
Price: $175
Manufacturer: SSM, Inc.
6250 Middlebelt
Garden City, MI 48135

This is being written on a TRS-80 Model I computer with ease and flexibility that previously had been available only on larger computers with much more expensive word processing programs. What has moved the Model I up into at least the Triple-A League, if not the true Big Leagues, of writing is a modestly priced word processer called Lazy Writer.

The best thing about Lazy Writer, from the viewpoint of a professional writer and editor, is not that it does exotic things, undreamt of by users of Electric Pencil and Scripsit. It is that it does the same things in a much simpler way.

Gone is the vexing problem of how to get a control key on the minimal keyboard of the TRS-80—control keys are not needed. More important, gone is the need to remember what the control key does, or to stick those sticky little reminder labels on the keys. And gone is the need to have the manual dexterity of a Mississippi River cardsharp to manipulate control-shift-character key combinations.

The program comes on a TRSDOS disk, which can be backed up as many times as necessary. Lazy Writer can also be run using the Dosplus 3.3D double-density operating system with a Percom Doubler board in the expansion interface. It also seems to run with the Percom DBLDOS system (which comes free with the doubler board), but I have not checked this combination extensively yet. Unfortunately, it will not work with NewDOS80 and DoubleZAP/II for double-density operation.

After booting the disk, the main menu for the program is loaded by pressing the "L" key. The main menu gives the choice of starting in "Text Entry" or "Edit," or to recover text from memory.

Switching between Text Entry and Edit is the key to Lazy Writer's simplicity. To switch from one to the other, you need only press the break key. The 15th line of the screen carries a message noting that the program is in Text Entry and the break key will move it to Edit. The 16th line in Text Entry lists the number of characters in your text, the maximum number of characters your computers memory can handle, the location of the cursor and the length of the line the cursor is on.

Entering Text

To write, start the program in Text Entry and begin. The only basic differences from writing on a typewriter are that instead of using shift-lock (which doesn't exist on the TRS-80 keyboard) to stay in capital letters, shift-clear is used, and the right-arrow key provides a five-space indentation after the enter key marks the end of a paragraph. That's it, all you need to know about Lazy Writer for bread-and-butter banging out of The Great American Novel.

Things are a bit more complicated in Edit, but not much. Typing "H" calls up a help file, which explains in detail what functions are available and how to use them (and you can add your own messages to fill in any personal blind spots about the system's operation).

The screen remains split in Edit, but the 15th line become a dashed separator and the 16th line tells only cursor position and line length, until one of the editing commands is used. Then the 15th line disappears and the function—"INSERTING," "DELETING," etc.—is printed as the 16th line.

The editing commands are extremely simple: "i" to insert, "d" to delete, "o" to overtype, "c" for change case (to make "DOG" into "dog" type the lower-case c over the D, O and G and there it is). Pressing the enter key makes your changes permanent; pressing break cancels them. The cursor can be moved up, down, right and left as usual with the arrow keys.

One of the really nice features of Lazy Writer allows skipping the cursor from word to word by pressing the space bar, sentence to sentence by pressing the period (".") and paragraph to paragraph by pressing the lower-case "p." The cursor can be moved backward in the text by using the shift key and the space bar or period.

George Bond, 328 8th St. SE, Washington, D.C. 20003.

These same functions can be used when deleting—"d" and space bar erase the next word, "d" and "." erase the next sentence, "d" and "p" erase the next paragraph. Single characters can also be deleted.

Equally simple commands allow Lazy Writer to search for strings of characters, words or strings of words; to search and delete; and to search and replace. Moving blocks of type is easy, too, and requires few keystrokes.

When using the print functions—you can select standard Centronics parallel, serial or special drivers from the keyboard—there are two choices for establishing the format of what you print.

The simpler method is to use a menu that appears when the print function is selected. Using the menu, you can change margins, line spacing, page length and such, as well as order multiple copies of your printing.

The more complicated method of entering printing instructions requires putting them directly into the text—"imbedding" them. This has several advantages, chief among them that the commands are permanent. This means that if you need to send out promotional form letters, for example, with some regularity, they will be uniform in appearance without any extra effort by you after the initial set-up. You also can imbed commands to tell your printer—if it is capable of doing so—to switch to double-wide characters, underline, overstrike for bolder letters, change line width and margins in the middle of text, and work all sorts of graphic magic. With enough patience, you could even set up little indented boxes for later insertion of illustrations.

Another nice feature of Lazy Writer is an auxiliary program to send what you write over telephone lines (using, of course, an RS-232 port and modem) to other computers. It also allows taking a read-only look at files from disk—in effect, listing them as you would from the DOS level—without leaving the editing program or destroying text in memory.

Documentation

All the functions of Lazy Writer are covered well in its documentation, which ranks among the best I have seen. It is on a par with the construction manuals for Heathkits and Dynakits.

Finally, a covering note in the documentation from Dave Welsh, who wrote Lazy Writer, bodes well for its future: "We view widespread misunderstanding (of how to use the system) as a program or a documentation fault to be corrected if possible."

If more authors, and computer people in general for that matter, would take such an attitude, life among the bits and bytes would be infinitely more enjoyable. ☐

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CIRCLE 131 ON READER SERVICE CARD

A Very Smart Program...

The Paper Mate

G. R. Boynton

creative computing
SOFTWARE PROFILE

Name: The Paper Mate
Type: Word Processor
System: 16 or 32K PET
Format: Disk or Tape
Language: Basic
Summary: Good, inexpensive word processor
Price: $40
Manufacturer:
A B Computers
252 Bethlehem Pike
Colmar, PA 18915

I am an aficionado of inexpensive word processors for the PET. I do a great deal of writing, and ever since I found out how easy it is on the PET I have been a fan. In searching for the "perfect" word processor I have investigated most of the not-too-expensive ones on the market. This is a review of the Paper-Mate by Michael Riley; a word processor written for the 16K and 32K 2001 series and the 16K and 32K 8000 series of Commodore machines.

Before describing this program I would like to give one overall evaluation. This is a very smart program. In addition to all the options there are many ways in which this program makes life easier for the user. One illustration: when loading or saving text the program begins by assuming that the user is employing a disk. But, if you use tape as I do, once you have instructed the program to use the tape drive it will continue with that assumption until you instruct it differently. It remembers what you did the last time. Now, this is not so important by itself, but it does indicate the care taken in the development of the program to make life nice for the user.

Any word processor must be able to perform the following operations: let you type text; let you edit the text that has been typed; let you save the text so it can be worked on later; and let you format the text for printing. In some cases this set of operations is split between two programs, a text editor and a formatting program. In this case text editing and formatting are combined in the same program.

There are two strategies for carrying out these operations. One involves the use of line numbers, and many of the operations center around sending the program to a given line for corrections, insertions or other operations. The other strategy lets you see what you are doing on the screen, letting you scroll or page through the text and use screen or cursor controls for editing and other operations. Paper-Mate is screen-oriented rather than line-oriented.

The program handles hyphenation in a very nice (and economical) manner.

Typing

Typing with Paper-Mate is straightforward. After the program is loaded, you tell it you want to write rather than edit, and begin typing.

The text is centered on the screen. The first and last columns of the screen are reserved for program operations, so the text appears in lines 37 characters long for 40-character screens and 78 characters long on the 80-character screens of the 8000 series.

While you are typing you can use the delete key to backspace and make corrections. You type continuously: just keep typing until you come to the end of a paragraph or other segment of text which requires a carriage return. By hitting the return at this point, a back arrow is left in the text, forcing a carriage return when the text is printed. When you are about to fill up memory with text the program says: 9 lines left; 8 lines left; etc. At this point it is time to save the text.

Editing

Anyone familiar with editing programs on the PET will find the most basic editing features of this program familiar: you use cursor controls to proceed forward or backward through the text. With the cursor controls you can go anywhere in the text. Then you can type over what is there, or use "delete" or "insert" to make corrections.

There are some extras, however. The cursor control characters have automatic repeating. Hold the key down for a half a second and the cursor goes scooting across the page. This little bonus is provided for all keys, not just the cursor controls.

You can page through the text. The "< " and the " >" are used to send you rapidly backward or forward through the text faster than is possible with the cursor controls.

You can transfer or delete a block of text or enter a blank line at a block in the text. First, you use "[" and "]" to define the block of text. Then you go to a menu (by hitting CLEAR), and type T (for transfer) or D (for delete) or I (for insert blank).

The formatting commands are extensive. Each begins with the "up arrow," and they can appear anywhere in the text. You can set left and right margins, and change them in the text as needed. You can set page size so the program will automatically skip to the next page on continuous paper, or have the printing pause while you insert a new piece of paper. If you want, the program will automatically print a header at the top of each page and a page number at the bottom of the page. There is a command for centering text and another for justifying text. And the list could go on.

Loading and saving text are done using the menu. Hit CLEAR and type either L or S. Then you are asked for the name of the file, and the device number to be used.

G.R. Boynton, Department of Political Science, The University of Iowa, Iowa City, IA 52242.

Printing

Printing the text has some rather nifty features built into it. You go to the menu. and type P. You are asked if the device number is 4; you can change it if it is not. Then it asks if it is the Commodore printer. and, if not, whether a line space command is necessary, and whether the interface translates PET ASCII into standard ASCII.

There are two printing features which are real bonuses. At the end of the text you can type " 'up arrow'nt=(name)," and after it has finished printing the current text it will automatically load the text with the file name given. That means printing texts which require more than one file to save them becomes more or less automatic. There is a hidden benefit in this command. The second text file does not have to include all of the formatting commands. The program remembers the instructions given in the first file, and continues to use them for the second file.

The second bonus feature is for people who use form letters. While the program is printing one file, it can be instructed to stop and add something from a second file. Thus names and addresses can be added from a second file and even paragraphs can be inserted. For small businesses this will make form letters very easy to construct and produce.

In all there are 60 commands in this program. too many to review. But there are a few additional nifty features which should be noted.

If you would like to convert a professional model PET into a "normal" typewriter model. give the correct instruction and the program will redefine the keyboard.

Perhaps you do not want to redefine the whole keyboard; you would like to redefine only a few keys. If you know the ASCII value for the characters it is a very simple matter to redefine any key.

The program handles hyphenation in a very nice (and economical) manner. You insert a format command which says you do not want more than some number of spaces between the end of the printed line and the right margin. When the program is printing and comes to a line in which splitting a word would be necessary to carry out the instruction it prints the end of the line on the screen. Then the operator decides where to hyphenate or not to hyphenate at all. Hyphenation from a dictionary would be impossible on a small machine like the PET, but this is a pretty good substitute.

A Few Negatives

Okay. what are the bad features? One is that you are limited to 100 lines of text in a given file on the 16K machines. And that is 100 lines of 37 characters for the 2001 series. The program is 8.4K before initializing anything so that does not leave much room for text with a 16K machine. For all the nifty features you have to pay a price in shuttling text back and forth to tape or disk.

It takes a good deal of learning to use this program. There are lots and lots of options. and it takes a while to learn all of them and how to use them effectively. I have found it somewhat difficult to adjust the automatic page size and the header and page number neatly. But the finished product is worth the effort.

The instructions that come with the program are rather terse; they packed the whole thing into 11 pages. Careful reading and practice is required. but everything seems to be explained adequately (if not at great length). With the instructions comes a list of all variables and their functions. The manufacturer has tried to make it easy for individuals predisposed toward fiddling with the program to do just that. And on the back page of the instructions is the full list commands. The cover is clear plastic—mine is yellow. So there is not even any glare.

This is a very good program. And the real clincher is it costs only $40. It must be the buy of the year. ☐

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CIRCLE 133 ON READER SERVICE CARD

The Education Game

David Lubar

In the interest of diversity, this roundup will stray somewhat from the hallowed path of drill and practice, covering some programs that attempt innovative approaches to education. In most of the cases below, the innovation is in the form of turning learning into a game. Whether this is desirable is up to the individual teacher to decide.

Crossword Magic creates what is known as the British style of crossword puzzles. This format has fewer intersections, and lacks the symmetry of American puzzles. The advantage of the British style is that it is harder to solve since the solver gains only a few clues with each new word. And words outside the topic needn't be included just for padding. Another advantage is that this style is easier to construct.

The program accepts words from the user, and attempts to fit them into a grid of up to twenty by twenty squares. Words cross only when there is a letter in common. The program is fast, though it seems to seek the first acceptable fit rather then searching for the fit with the most crossings. Once the crossword is generated and the user has supplied a cue for each word, a printout can be generated on an Epson. Puzzles can be saved on either the master disk or a player disk. Each player disk can hold twenty puzzles, and additional player disks are available. It would have been nice if the program allowed puzzles to be saved to any disk.

creative computing
SOFTWARE PROFILE

Name: Crossword Magic

Type: Puzzle utility

System: 48K Apple, Disk Drive, Silentype or Epson with graphics capability

Format: Disk

Language: Machine Language

Summary: A fitting program for puzzle makers

Price: $49.95

Manufacturer:
L+S Computerware
P.O. Box 70728
Sunnyvale, CA 94086

When solving puzzles on the Apple, the user moves through the grid with the arrow keys. The program is smart enough to skip over areas that aren't part of the actual puzzle grid. When the solver is finished, the answers can be displayed. Mistakes are shown, along with an error count.

As far as educational applications, that is up to the user. The program will fit the words and print or present the puzzle, but the teacher is responsible for any educational value in the puzzle. Basically, the user will get out whatever he puts in. With the proper thought, the puzzles can be put to good use in many classes, reinforcing both vocabulary and concepts. If a teacher likes the idea of using crossword puzzles in class, this program has a lot going for it.

Fellow two-finger typists, there is hope. *Mastertype* adds some fun to the drudgery of educating the fingers. The concept follows the classical approach of starting with the "home" letters (the row the fingers rest on), and expanding from there in a methodical manner. The fun comes in the form of a game. The player has a base in the center of the screen. Words or letters, depending on the level, appear in the corners. Enemy ships approach from each corner. Correctly typing a word results in a shot being fired at that corner. If a ship gets too close, it damages the base.

Mastertype adds some fun to the drudgery of educating the fingers.

Specialized lessons, containing forty words, can be created by the user, and may be saved to either the *Mastertype Disk* or any initialized disk.

creative computing
SOFTWARE PROFILE

Name: MasterType

Type: Typing instruction

System: 48K Apple, Disk Drive

Format: Disk

Language: Machine Language

Summary: A fun way to learn

Price: $39.95

Manufacturer:
Lightning Software
P.O. Box 11725
Palo Alto, CA 94306

A selection of nice features augments this program. Typing speed is displayed at the end of a series, and the user can slow the program if he has trouble. While the idea that having fun while learning to type goes against all tradition, I like it.

Vocabulary Baseball from J&S contains a pool of 1000 words, along with multiple choices for definitions. Each time he goes to bat, the player can attempt a single, double or triple. The more bases he tries for, the harder the word. A correct answer puts a man on base. A mistake is an out. At the option of the player, a game can last one, two, or three innings. The high score for each length game is saved on disk,

(Continued on page 67)

Complete line of MECC software for Apple computers now available...

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A tall order.

But one which MECC has met.

The Minnesota Educational Computer Consortium (MECC) was founded in 1973 with the goal of extending the benefits of computers to every school in the state. Over the years, MECC has developed procedures for finding and perfecting programs from contributors throughout the state.

Few Programs Qualify

Before a program is accepted for the MECC library it is judged on specific criteria. For example:

1) Accuracy...Is all spelling and grammar correct? Does each question provide for a correct and appropriate response?

2) Audience...Is the intended audience (grade level and subject) served by the degree of difficulty and scope of the program? Is the reading level of the text material suitable?

3) Clarity...Are explanations and instructions sufficient, clear and straight forward? Is the presentation well-formatted?

4) Graphics...Are the graphics appropriate and sufficient in quantity?

Other criteria include documentation, function, programming, and the like. Similar criteria are applied to the documentation. This insures that the reading level is appropriate, that objectives are well-stated and that associated materials are available.

What this all means is that the educational software packages from MECC are among the best available anywhere. They are pedigogically sound, thoroughly tested and well documented.

Now the MECC software library is available to both schools and individuals through Creative Computing Software.

MECC software is currently available only on disk for the Apple II. All disks run under DOS 3.2 and require a minimum of 32K memory and Applesoft in ROM or an Apple II Plus.

Software using a printer uses the Apple serial, parallel or communications card.

Apple Demonstration Diskette
MECC-701, $19.95

A sample of the different kinds of applications available on the MECC diskettes is shown. The software demonstrates applications in drill and practice, tutorial, simulation, problem solving, and worksheet generation. Samples from music, science, social studies, industrial arts, reading and mathematics are provided.

Elementary—Volume 1 (Mathematics)
MECC-702, $24.95

The first elementary diskette contains programs to be used in the elementary mathematics classroom. Games of logic such as BAGELS, TAXMAN and NUMBER, drill and practice programs, such as SPEED DRILL, ROUND, and CHANGE, and programs about the metric system such as METRIC ESTIMATE, METRIC LENGTH, and METRIC 21 are included on the diskette.

Elementary—Volume 2 (Language Arts)
MECC-703, $24.95

The teacher can enter lists of spelling words in the computer and have them used by the program SPELL, which drills students on the spelling, MIXUP which presents the word in mixed up order, or WORD FIND, which will create a word find puzzle for the teacher to duplicate. If words and definitions are entered, a CROSS WORD puzzle can be generated or a WORD GAME can be played. Two other programs included on this diskette are TALK, a program designed to introduce students to the computer or AMAZING which prints out worksheet mazes. Several programs on this diskette use a printer.

Elementary—Volume 3 (Social Studies)
MECC-704, $24.95

The sell series, SELL APPLES, SELL PLANTS, SELL LEMONADE and SELL BICYCLES which appears on the ELEMENTARY VOLUME 3 diskette can be used to teach elementary economics to students in grades 3-6. CIVIL will reenact battles of the CIVIL war while STATES and STATES 2 provide drill and practice on the location of states in the U.S. and their capitals.

Elementary—Volume 4 (Mathematics And Science)
MECC-705, $24.95

Two mathematics programs ESTIMATE and MATHGAME provide reinforcement on estimating and basic facts. Food chains in fish can be studied through ODELL LAKE while ODELL WOODS deals with food chains in animals. SOLAR DISTANCE teaches the concepts of distances in space and URSA provides a tutorial on constellations.

Elementary—Volume 5 (Language Arts)
MECC-719, $24.95

ELEMENTARY—VOLUME 5 deals with the reading concept of prefixes. The diskette contains five lessons which both teach the prefixes of UN, RE, DIS, PRE, and IN. Two review drills, DRAGON FIRE and PRE-APP II, are also contained on the diskette.

Elementary—Volume 6 (Social Studies)
MECC-725, $24.95

Historical simulations, OREGON, VOYAGEUR and FURS are included in the ELEMENTARY—VOLUME 6 diskette. Along with these programs are NOMAD which teaches map reading and SUMER, a simulation of ancient Sumeria.

Special Needs—Volume 1 (Spelling)
MECC-727, $24.95

This diskette is designed to drill handicapped students on frequently misspelled primary and intermediate words. Students answer problems by either using the game buttons, the game paddles or any key on the keyboard.

Science—Volume 2 (Senior High)
MECC-709, $24.95

Many of the programs on this diskette were developed by Minnesota teachers. PEST, which deals with the use of pesticides, and CELL MEMBRANE, in which the user takes the part of a cell membrane, can be used in biology classes. SNELL plots light refraction demonstrating SNELL's law while COLLIDE simulates the collision between two bodies. Diffusion deals with the diffusion rates of various gasses. NUCLEAR SIMULATION shows radioactive decay of nine different radioisotopes, ICBM and RADAR teach angles and projections on a coordinate system.

Science—Volume 3 (Middle School)
MECC-707, $24.95

The FISH program through the use of low resolution graphics shows the circulatory system of a fish. Simulations like ODELL LAKE which is used to explore food chains, URSA which teaches about constellations, and QUAKES which simulates earthquakes are on the diskette. MINERALS can be used in the area of earth science to identify 29 minerals by having students perform simple tests.

Mathematics—Volume 1 (Senior High)
MECC-706, $24.95

BAGELS, SNARK, ICBM, and RADAR will teach students logic while reinforcing the concepts of plotting prints or angle measurements. ALGEBRA provides a drill and practice in solving equations. Three programs on the diskette can be used in plotting equations on a grid: SLOPE which is designed for use in ninth grade with linear functions, POLYGRAPH which will plot any equation on a rectangular coordinate system, and POLAR which graphs functions on polar coordinates.

Aestheometry—Volume 1
MECC-716, $24.95

Aestheometry teaches the topic of curves by viewing curves from two perspectives. The first method demonstrates the "space concepts" of elliptical, parabolic, and hyperbolic curves. Curve sketching designs are developed to provide an aesthetic view of geometric shapes. The second method uses a mathematical approach and defines a curve as the intersection of planes with a cone. The support booklet provides worksheets and classroom ideas.

Teacher Utilities—Volume 1
MECC-715, $24.95

The TEACHER UTILITIES diskette is designed to aid the teacher and would not be used by the student unless the teacher creates questions using the REVIEW program. This program allows the teacher to set up a list of questions which can be used either by the REVIEW program or the TEST GENERATOR program. The teacher can also make CROSSWORD puzzles, WORD FIND puzzles, BLOCK LETTER banners and POSTERS using this program. FREQUENCY and PERCENT can be used to calculate grades and to do statistical analysis. A printer is needed for some of the programs on this diskette.

Programmer's Aid—Volume 1
MECC-720, $32.95

The PROGRAMMER's AID diskette provides help for the programmer. Programs to be able to UPLOAD and DOWNLOAD to the MECC system, programs that work with text files including FP TO TEXT, RANDOM EDITOR, SEQUENTIAL EDITOR, and TEXT LIST along with programs to work with binary files, BINARY FILE INFO, BINARY FILE TO FP are included. Two programs TABLES and MERGE allow the user to create, change and merge graphic shapes for use in a program. FREE SPACE will tell the amount of space on the diskette while HIDDEN CHARACTERS will locate control character. STARTER will put standard routines such as space bar, music, graphic characters or input into a user's program which is just being created or already created.

MICAS—Volume 1 MECC-721, $49.95

Microcomputer Integrated Computerized Accounting System requires dual disks and 132 characters width printer. The MICAS computerized accounting system provides a realistic experience with automated accounting systems. The package consists of four integrated systems: (1) general ledger, (2) accounts payable, (3) accounts receivable, and (4) inventory control.

Shape Tables—Vol. 1 MECC-724, $24.95

The SHAPE TABLES diskette includes 12 files of 187 shapes than can be incorporated in a user's program. Also included are aids needed to work with shape tables.

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Arith-Magic

Problem Solving Programs for Older Students

Dan Isaacson

creative computing

SOFTWARE PROFILE

Name: Arith-Magic

Type: Math

System: 32K TRS-80 with Disk Drive or 48K Apple, Applesoft, Disk Drive

Format: Disk

Language: Basic

Summary: Different and well done

Price: $35

Manufacturer:
Quality Educational Designs
P.O. Box 12486
Portland, OR 97212

Whenever I go into a bookstore I always look for a new book by an author I have read before and liked. I am seldom disappointed. I'm finding that idea carries over into quality software, too. I liked Quality Educational Designs' earlier product, *Math Problems*, and, not surprisingly, I like their current effort, *Arith-Magic*.

There are three problem-solving programs in this set: Diffy, Tripuz, and Magic Squares. All give practice in mental arithmetic with addition, subtraction, multiplication, or division. All are motivational and different from most usual drills.

Diffy

In Diffy, the student selects four natural numbers which are printed on the screen as the corners of a square. Then he finds the difference between each successive pair of numbers. The four differences become the corners of the next square. The student continues finding differences and creating new squares until the number in each corner is zero. The objective is to find four original numbers which will require as many moves as possible to reduce to zero.

A sample game asks for four numbers. The numbers are displayed like this:

```
    ?
 3   27
 13  31
```

What is the difference between the two numbers on each side of the "?"? The student is given two chances to respond correctly and then the correct answer is printed. The next frame would look like this:

```
    24
 3   27
      ?
 13  31
```

Diffy keeps track of the largest number of moves by any player so far, along with the player's name, which is an excellent motivational reward.

Tripuz

Tripuz asks the student to choose addition or multiplication for practice. The computer generates three numbers:

```
? 18 ?
 24 48
   ?
```

and asks for a value of the ? where the middle numbers (i.e. 24 and 18) are found as the product of the two numbers on either side. The final solution to this problem is:

```
3  18  6
 24  48
    8
```

At the secondary level, algebra students are encouraged to look for a general algebraic solution for both the addition game and the multiplication game.

Although addition and multiplication are the modes available, students must use the inverse concepts of subtraction and division to solve the puzzles.

Magic Squares

Magic Squares leads the student to an intuitive understanding of averages and arithmetic sequences. In 20 years of teaching I have never been motivated by magic squares, but now, after using the Magic Squares program, I have painlessly learned the concepts involved in designing a magic square; a big hand for QED.

Magic Squares provide an example of the power of computer simulation in problem solving. The computer eliminates computational drudgery and allows the user to concentrate on concepts and hypotheses.

Commentary

I can't end a review without commenting on programming style in general. Software producers, like students, learn by doing—each new program is better than the last from a style point of view, but it is the reviewer's job to keep producers

---

Dan Isaacson, School of Business, California State University, Fresno, CA 93740.

on their toes. I make the following observations hoping that future courseware for schools will show increased awareness of the psychological considerations in courseware design.

QED has correctly allowed users to press one key to mean a whole word (such as Y for Yes), but the program also accepts YED as YES. I suggest rejecting more than one character as a response, thus short-circuiting this problem.

Long, animated title pages (sometimes with sound) are great—the first time through. But users get exasperated with them if the program is used often. (Title pages seem to take longer and longer each time one uses them.) I've had comments on some programs like: "After the fifth time, I turned off the sound because it drove me nuts!" Title pages in these three games are slightly too long. It would be nice if a user could skip the title page after the first use.

Because everyone reads at a different speed, I would recommend that no message leave the screen until the user allows it to leave. In almost all cases, that's how QED has programmed. Several times, though, a praise message is not under user control and leaves the screen unexpectedly, which jars the user.

It is desirable that users be able to page backward as well as forward in a tutorial. We all have read a paragraph and then realized that we didn't remember a thing in it. A book allows us to go back and re-read it. Many educational programmers have not recognized that necessity yet. I felt a desire, several times in Magic Squares, to return to a previous frame—which I couldn't do. Fortunately, later on, the program cycled through those frames I wanted, but I was temporarily frustrated as I couldn't get the help I needed exactly when I needed it.

As a final note, I found no way to exit from the program menu without turning off the computer and re-booting. This is an understandable consequence of the author's attempt to protect his copyright and prevent piracy, but it makes programs less user-friendly. I hope this problem is shortly overcome.

Now if programmers have heeded my concerns, prospective purchasers may ignore this reviewer's wishful suggestions and consider buying a copy of Arith-Magic. I, for one, look forward to finding more, new releases from QED at my friendly, neighborhood computer store.☐

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Karel's language is an expertly tailored version of Pascal that serves as an excellent introduction to structured programming and computer literacy.

A Course Disc is also available, offering a clear, step-by-step program of increasingly challenging problems and solutions for Karel the Robot to accomplish. It is invaluable when used to help develop a classroom curriculum, or as a personal learning tool. Already, it is being used in universities and high schools.

Karel the Robot's creator is Richard E. Pattis, author of the book, "Karel the Robot: A Gentle Introduction to the Art of Programming," recently published by John Wiley & Sons. Arthur Luehrmann acclaims the book "A gem," and says that educators will find the Karel package "both entertaining and truly instructive."

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cii
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CIRCLE 134 ON READER SERVICE CARD

Educational Software

David Lubar

Almost every software house in existence seems to be producing something for the educational market. Since it is impossible to cover every program, we have chosen a random sampling of software to review; some of the programs were requested from the manufacturers, others came in unsolicited.

On the Dotted Line

Sentence Diagramming gives a good presentation of a difficult subject. This Apple disk was developed using the ZES authoring system which, along with several other authoring systems, will be reviewed in a future issue. The diagramming program offers the teacher a selection of options for each student, such as level of difficulty, percent correct before moving to the next level, and whether to present only the question part and skip actual diagramming. The program contains twenty sentences for each of three levels, each level has four segments, any one of which can be used by itself in the classroom.

In the first section, the student must determine the part of speech for each word in a sentence. If a mistake is made, the correct answer is shown. Once all the words have been classified, the student is given a chance to pick the usage for words and phrases. Since this is more complex than picking parts of speech, the student has the option to select only those with which he is familiar, and to move to the next section at any time. In the third segment, the student must identify the sentence type. Finally, he gets to the diagramming portion. This segment puts an unfilled diagram form on the text screen. The student must fill it in with the correct words from the sentence.

creative computing
SOFTWARE PROFILE
Name: Sentence Diagramming
Type: CAI English
System: 48K Apple, ROM Applesoft, Disk Drive
Format: Disk
Language: Basic
Summary: Can be used in whole or in parts to teach grammar concepts.
Price: $24.95
Manufacturer:
Avant-Garde Creations
P.O. Box 30160
Eugene, OR 97403

If the teacher selects the record-keeping option, he can see a student's entire record, or the latest record for each student. The record contains the level and the percentage score of the student. It should be mentioned that this particular program is for drill only; it doesn't provide tutorial material. But for what it does, *Sentence Diagramming* is a good presentation of a tough subject.

For the Very Young

Sammy the Sea Serpent is a computerized story book for children ages 4 and up. The program combines graphics on the Atari with an audio track on the cassette to tell the odyssey of Sammy. The child interacts by means of a joystick, guiding Sammy through mazes, helping him catch flies, and moving him from one story segment to the next. While the program helps develop eye-hand coordination, its main function is to act as a storyteller. It succeeds in this task. The flip side of the cassette contains two games that can be played with Sammy. The games (one where the player leads the serpent through a maze and the other where the player helps Sammy catch flies) appear in the story, but can be played repeatedly by themselves. Though no replacement for a human storyteller, *Sammy the Sea Serpent* is definitely a step above Saturday morning cartoons. Parents who are concerned whether the program will be used more than once should remember how often children will sit through a rereading of a favorite storybook.

creative computing
SOFTWARE PROFILE
Name: Sammy the Sea Serpent
Type: Entertainment
System: 16K Atari, Joystick
Format: Cassette
Language: Basic
Summary: Interactive picture story.
Price: $16.95
Manufacturer:
Program Design, Inc.
11 Idar Ct.
Greenwich, CT 06830

Rewarding Figures

The Math Machine takes drill and practice a step above the usual drudge level. This Apple disk contains a full system including record-keeping capabilities. At the start, the user is asked for a password. If a student is using the program, his password starts the drill. The teacher's password gives him access to the options menu. Here, he can add or delete a student from the files, review records, obtain a list of students, or change a student record. To make an assignment, the teacher first selects from one of seven categories, which range from pre-math for kindergarteners to multiplication for 7th grade and above.

The program then lists and describes the levels within the category. Pre-math has the fewest with nineteen levels, addition has the most with 29 levels. After selecting the desired level, the teacher selects the number of correct answers the student is required to make before receiving reinforcement. This reinforcement is in the form of games. Whenever the student has achieved the required number of correct answers, he gets to select from a menu of six games. The games, while not of arcade quality, are adequate for reinforcement purposes.

The math problems are presented with large lo-res numbers. If any problem is missed twice, the correct answer is displayed. The program does not provide any help or branch to different difficulty levels. The student can keep going as long as he desires, or until he or the teacher hits escape. The student record contains the category and level, along with the number of problems attempted, the number correct, and the number of reinforcements. While not perfect, *The Math Machine* seems to be a good presentation of drill and practice.

creative computing
SOFTWARE PROFILE

Name: The Math Machine
Type: CAI Math
System: 48K Apple with ROM Applesoft, Disk Drive
Format: Disk
Language: Basic
Summary: Well-designed math system
Price: $79.95
Manufacturer:
SouthWest EdPsyche Services
P.O. Box 1870
Phoenix, AZ

Good Grammar

Instead of drill and practice, the format of *English Usage Exercises* seems to be explain and drill. These programs for the TRS-80 contain approximately one hundred short sessions per disk. Each session begins with an explanation and examples of a concept, followed by questions. The entire set consists of four volumes. Volumes I and II were available for review. Each session sticks to a specific topic, such as verbs ending with "ing," or sentences with double subjects. The scope and variety of the lessons provides teachers with a tool that can be used either as a whole or in portions. The only problem is that the computer, aside from immediately telling whether the answer to a problem is correct or not, provides nothing that can't be obtained through a workbook. It does provide ready-made drills that are convenient to use, but seems to be an adaptation of the computer to traditional techniques rather than an adaptation of techniques to the capabilities of the computer.

creative computing
SOFTWARE PROFILE

Name: English Usage Exercises
Type: CAI English
System: 48K TRS-80, Two Disk Drives
Format: Disk
Language: Basic
Summary: Extensive set of grammar programs.
Price: $149.95 per volume
Manufacturer:
3R Software
P.O. Box 3115
Jamaica, NY 11413

Quizzer

Though outwardly a game, *The Wizard* has the potential to turn the TRS-80 into a fun teaching device. The program presents a quiz game for from one to four players. In turn, each player is given a question with four possible answers. If he chooses the correct answer, he receives a predetermined number of points. The twist to the game is that players can steal a question. A successful steal earns double the point value. If the thief answers incorrectly, he loses double. The educational aspect comes from the ability to create sets of quizzes. Up to six quizzes can be stored on a disk, and up to 100 questions can be entered into each quiz file. With this capability, the program can be molded to suit almost any classroom situation. As another plus, *The Wizard* is one of the few programs on the market that allows four people to use one computer at the same time. And the price is hard to beat.

creative computing
SOFTWARE PROFILE

Name: The Wizard
Type: Game
System: 48K TRS-80, Disk Drive
Format: Disk
Language: Basic
Summary: Fun and potentially a good educational tool
Price: $19.95
Manufacturer:
Programs Unlimited
P.O. Box 265
Jericho, NY 11753

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CIRCLE 135 ON READER SERVICE CARD

Educational Software, continued...

By the Numbers

Educational Micro Systems, Inc. has a rather broad set of math programs for grades two through eight. The programs, on tape or disk for TRS-80 Models I and III, cover arithmetic, simple logic, and metric/English conversions. The basic appeal of the programs is their flexibility. Teachers can specify a variety of parameters for the programs. For instance, in addition, there are fourteen types of addends, including single random digits, four-digit multiples of ten, and four-digit numbers with zeroes in the hundreds place. The teacher specifies whether the student will receive assistance for each incorrect digit, or assistance only after the problem is answered. Also, the teacher has the option to allow a reward for correct answers. This reward is in the form of a rocket that crosses the screen. After the student answers correctly, he hits the space bar, sending a missile at the rocket. Finally, the program can run in either a practice mode, or in a test mode. The test mode, of course, doesn't include the reward or assistance options, but problems can be presented with a time limit.

creative computing
SOFTWARE PROFILE

Name: EMSI-6

Type: CAI Math

System: 16K TRS-80 (32K if on disk)

Format: Disk or Cassette

Language: Basic

Summary: Comprehensive math series.

Price: $199.95 for the entire set (individual programs also available)

Manufacturer:
Educational Micro Systems, Inc.
P.O. Box 471
Chester, NJ 07930

After the student has finished the specified number of problems a full report is given showing both the problems and the answers given, as well as marking those problems where help was requested or mistakes were made. The series also contains four programs that generate worksheets with math problems.

While the general concept of this package is good, it is unfortunate that the disk version is nothing but the cassette version transferred to a new medium. No record keeping has been added, thus missing one of the greatest potential advantages of the disk.

Backtalk

A classic program with a fair amount of educational potential has found its way into compiled Microsoft Basic for CP/M systems. *Eliza*, the interactive psychoanalyst is a program that converses with the user, providing a simulation of a non-directive therapist. This version, from the Artificial Intelligence Research Group, contains a few extra touches which existed in the original but were absent from previous Basic translations. Rather than just replying to the most recent statement, it will occasionally refer back to previous inputs. And, since the program is compiled, it runs fairly quickly. *Eliza* has potential use in various subjects. She could obviously be used in a course on psychology, but could also provide material for courses in communications, computer literacy, and other areas. It should be mentioned that *Eliza* has been available for several years on an 8" disk, along with 49 other games, as *Basic Games-3* from Creative Computing (Microsoft required), and that a listing of the program is included in the book *More Basic Computer Games*, also from Creative Computing.

creative computing
SOFTWARE PROFILE

Name: Eliza Version 3.0

Type: Interactive

System: CP/M System, Disk Drive

Format: Disk

Language: Compiled Microsoft Basic

Summary: Program includes features from the original Eliza.

Price: $25

Manufacturer:
Artificial Intelligence
Research Group
921 North La Jolla Ave.
Los Angeles, CA 90046

A Worthy Project

The majority of educational software is aimed at the elementary and high-school level, with most of the overflow hitting the colleges. One fine exception is a series of programs covering basic living skills for special learners. The programs cover important areas such as home safety and money management. Each program is very well done and includes all the trappings of good CAI. There are three levels of instruction, covering reading abilities from second to fifth grade, and the program branches to the appropriate level indicated by the user's response to questions. When the topic permits, the programs use graphics, adding to their appeal.

There are presently six programs available. *Job Readiness* gives a quiz to determine work attitudes and attempts to develop and reinforce positive work attitudes. From there, it goes on to cover job applications, interviews, and job-placement resources. *Home Safe Home* demonstrates potential hazards in the home, focusing on the identification and prevention of electrical, fall, and poison hazards. The other programs are *Income Meets Expenses*, *Money Management Assessment*, *You Can Bank on it*, and *Poison Proof Your Home*. Each program is supported by an extensive set of worksheets for the user. These programs represent a good start toward filling the needs of a frequently-neglected segment of the population.

creative computing
SOFTWARE PROFILE

Name: MCE (Microcomputer Educational Programs)

Type: CAI Basic Living Skills

System: 48K Apple, ROM Applesoft, Disk Drive

Format: Disk (from 4 to 8 diskettes are supplied per program)

Language: Basic

Summary: Fills a crucial need

Price: Ranges from $165 to $340

Manufacturer:
Interpretive Education
2306 Winters Drive
Kalamazoo, MI 49002

PET Drill

Addition - All Levels, and *Subtraction - All Levels* are two good drill and practice programs for the PET. The addition program has 24 skill levels, and subtraction has twelve, making the programs suitable for grades one through six. The teacher or student can also specify a time limit and other options. Correct solutions are greeted by a graphic creature that waddles onto the screen. The main appeal here is a versatile program at a low cost. As a further bonus, the programs will run on any flavor of PET, despite the abundance of incompatible ROMs out there. ☐

creative computing
SOFTWARE PROFILE

Name: Addition—All Levels, Subtraction—All Levels

Type: CAI Math

System: 8K Pet

Format: Cassette

Language: Basic

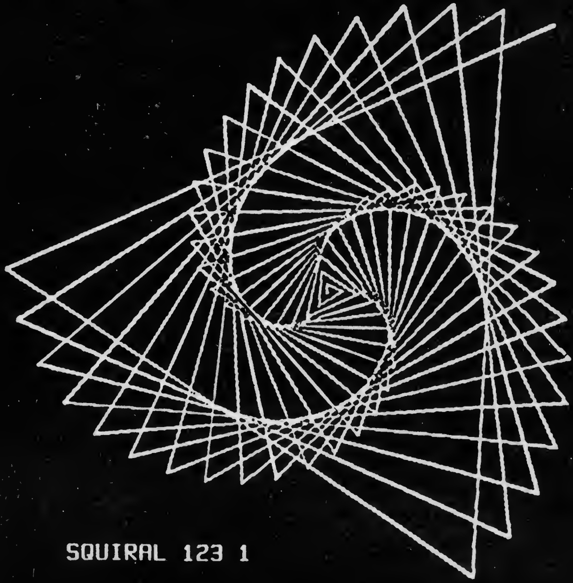
Summary: Good drill and practice application.

Price: $20 each

Manufacturer:
Teaching Tools:
Microcomputer Services
P.O. Box 50065
Palo Alto, CA 94303

The Logo Language is Here
It's the Learning Language

```
TO SQUIRAL :ANGLE :DISTANCE
 IF :DISTANCE > 200 THEN STOP
 FORWARD :DISTANCE
 RIGHT :ANGLE
 SQUIRAL :ANGLE :DISTANCE + 3
END
```



SQUIRAL 123 1

Terrapin, the Turtle Company, brings you the Terrapin Logo Language for the Apple II with Turtle graphics, now ready for immediate delivery.

The Terrapin Logo language is for students and teachers at every level. It was carefully designed by professional educators and artificial intelligence researchers to promote structured, logical thinking. It encourages exploration and experimentation, helping students to take an active role in the learning process. The language is so easy to use that it quickly overcomes fear of the computer. Simple graphics commands make using the computer fun and exciting for young children.

But it doesn't stop there. Children won't outgrow the Terrapin Logo language. It grows with them. The Logo language includes many features common to artificial intelligence research languages permitting programs of great power to be written quickly and easily. Writing comparable programs in other languages is usually much more difficult and time consuming.

The Terrapin Logo language was developed by the Artificial Intelligence lab at the Massachusetts Institute of Technology. Terrapin is now authorized by MIT to distribute the results of its 12 years of research to you. To provide quality support for the language, Terrapin has assembled a team that includes two of the three authors who developed the Logo language for the Apple II at MIT.

Dr. Wally Feurzeig, the originator of the Logo language, Dr. Sylvia Weir, Dr. Nancy Roberts, and Dr. Paul Goldenberg, who have been involved with the Logo project for many years, think the Terrapin Logo language is so good that they have just joined Terrapin's Board of Educational Directors.

Every copy of the Terrapin Logo language comes with complete documentation. To run the language, a 48K Apple II with a 16K RAM card or a language card, and one disk drive is required.

Terrapin also offers the robot Turtle, and the following books: *Turtle Geometry, Special Technology for Special Children, Mindstorms, Katie & the Computer,* and *Apple Logo* from Byte Books.

Suggested retail price: $149.95
To order or for more information, call or write:

Terrapin, Inc.
678 Massachusetts Avenue
Cambridge, MA 02139
(617) 492-8816

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CIRCLE 136 ON READER SERVICE CARD

Carbon Copy

David Lubar

creative computing

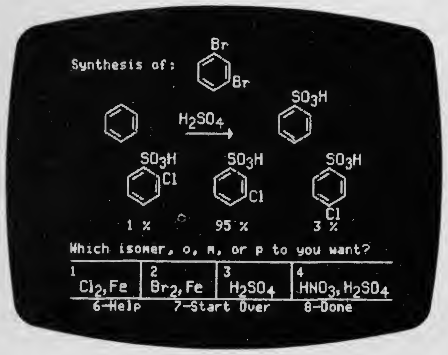
SOFTWARE PROFILE

Name: Introduction to Organic Chemistry
Type: Educational
System: 48K Apple, Applesoft, Disk Drive
Format: 7 Disks
Language: Applesoft
Summary: Comprehensive package with excellent labs.
Price: \$350 (Individual disks available for \$60)
Manufacturer:
COMPress
P.O. Box 102
Wentworth, NH 03282

Introduction to Organic Chemistry is possibly the most ambitious series of programs yet written for a small computer. The set of seven disks contains tutorial material, demonstrations, and experiments that go all the way from recognition of simple saturated carbon chains up to introductory spectroscopy and reactions of carboxylic acids.

The bulk of the material is tutorial, with frequent questions occurring throughout. The information is presented in text on the hi-res screen, with double-size letters for chemical formulas. Some new concepts are first introduced as part of a question. For instance, in one question, a linear chain with one branch is shown, and the student is asked the length of the chain. If the user determines the length by counting the carbons in the linear portion, he will be wrong, since the longest chain follows one of the branches. After the question has been answered, the program explains this. By presenting such concepts in this manner, the student is unlikely to forget what he has learned.

One weak point is that the full potential of CAI has not been tapped in these programs. An incorrect answer will sometimes result in a hint, but often just causes the program to give the correct answer. A bit of branching, or some messages telling the student to go back to a certain segment, would have increased the strength of these programs. The student can obtain help with a question by typing control-A, but this help is generally the same response given to an incorrect answer.



```
Which isomer, o, m, or p to you want?
1          2          3          4
 Cl2,Fe    Br2,Fe     H2SO4      HNO3,H2SO4
  6-Help      7-Start Over    8-Done
```

An example from the Multistep Synthesis of Aromatics section. In this case, the selected reagent produced three isomers, from which the student must choose. Though the selected reagent was incorrect in this example, the program still carries out the reaction, allowing the student to experiment.

The demonstrations are animated and interesting. One sequence shows the importance of heat in a reaction by having one molecule ram another at various speeds. Finally, when enough energy is involved, the molecules bond, kicking free a byproduct. The graphics are put to good use demonstrating such concepts as rotation of molecules. This aspect of the programs definitely makes use of the powers of the computer, and rises above being merely an electronic textbook.

The experiments are the highlight of the package. In one, the student is given a target aromatic and three possible starting choices. By choosing the proper reagents, he has to synthesize the target. At each step, the resulting compound is displayed. If the reagent is not sufficiently reactive, a message is displayed. Messages are also used when the computer is not familiar with a reaction, or if the reaction is not possible for other reasons. Not only does this make full use of the computer, it also provides a safe and inexpensive way to experiment with synthesis. Considering the toxic or carcinogenic nature of many organic chemicals, this is definitely a plus. In another set of experiments, the student is allowed to give different temperatures or concentrations for a reaction, and then see a graph of the results. This is followed by presentation of the appropriate formula for determining the result.

The package has many positive features. The input routines are good. After asking how many hydrogens can bond to a carbon, the program will accept either "four," or "4." While this might seem like a minor matter, it shows that the programmer has some regard for the user. As mentioned, the experiments and demonstrations are very good. The graphics are clear and clean, and the text is readable.

On the negative side, the program is very linear, putting all effort in presenting the material, and no effort in recognizing problem areas or helping a student who is having difficulty. Also, some concepts are introduced without explanation. In the section on spectroscopy, C-H stretch is shown on a spectrum, but not explained. The user who wants to know more won't get help from the program. For this reason, the program would not be well suited to home study unless the user had other resources available to fill in the gaps.

Based on the large amount of material provided in this package, and the high quality of the lab programs, *Introduction to Organic Chemistry* would be an excellent purchase for any college library or chemistry department, and would also be of value for any high school that needs resources for advanced students. ☐

(Continued from page 58)

allowing students to compete. Though the banner for the program is in hi-res, the game is played on the text screen, with X's for the runners and white rectangles for the bases.

A clever student, who is more interested in score than challenge, will quickly discover how to "beat the system." While every triple after the first will bring home a run, so will every single after the bases are loaded. So, after making three singles, the player can stick to singles and score a run every time. Still, the incentive to try for triples is there, and most students will probably take a shot at the harder words.

> **creative computing**
> **SOFTWARE PROFILE**
>
> **Name:** The Vocabulary Baseball Game
>
> **Type:** Educational
>
> **System:** 48K Apple, Applesoft, Disk Drive
>
> **Format:** Disk
>
> **Language:** Applesoft
>
> **Summary:** Provides competitive practice on definitions
>
> **Price:** $29.50
>
> **Manufacturer:**
> J&S Software
> 140 Reid Ave.
> Port Washington, NY 11050

With the large base of words, a teacher can get a great deal of mileage from the program, especially since no words are repeated during a game. And any student who can get through all the words on the disk without an out should probably be writing programs instead of playing with them.

Meet the Presidents from Versa Computing is a graphic delight. The program is somewhat reminiscent of a television game show. The student first sees a blank screen. Then lines appear, crossing in different geometrical patterns. The lines are actually unmasking a picture stored in another area of the Apple. The picture is of an American president. As the picture appears, clues are presented at the bottom of the screen. When the student knows who the president is, he types the name. The goal is to give the name before the entire picture has been revealed. After a series of ten pictures, the student is given a score based on his response time. The score for each picture starts at 100. If it reaches zero for any president, the student is given another chance.

The two double-sided disks contain 40 pictures done by Saul Bernstein, the artist who did the excellent drawings that come with *Micro Painter*. An option in the program allows the pictures to be presented in a slide show. Another option allows the teacher to change the clues. Topping it off, the input routines are very tolerant of typing errors. Each name is recognized by a series of key letters, which can also be changed by the teacher.

> **creative computing**
> **SOFTWARE PROFILE**
>
> **Name:** Meet the Presidents
>
> **Type:** Educational
>
> **System:** 48K Apple
>
> **Format:** 2 Disks
>
> **Language:** Applesoft and machine language
>
> **Summary:** Good graphics highlight this quiz.
>
> **Price:** $39.95
>
> **Manufacturer:**
> Versa Computing
> 3541 Old Conejo Rd. Suite 104
> Newbury Park, CA 91320

Meet the Presidents makes good use of Apple graphics and sound. Again, teachers must decide whether the game fits into a curriculum. But, with the ability to change clues, the program could probably be put to good use in many situations. □

CHEMISTRY COURSEWARE FROM COMPress

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for the Apple II*

with 48K of memory, 3.2, 3.21 or 3.3 DOS and Applesoft*

INTRODUCTION TO ORGANIC CHEMISTRY
by Professor Stanley Smith, University of Illinois
Set (Disks 1-7) $350. Individual Disks @ 60 ea.

THE LITTLEST PROFESSOR

These superior programs provide an introduction with practice on nomenclature and simple reactions of alkenes, alkyl halides, alcohols, aldehydes and ketones, carboxylic acids and arenes. In addition, the programs allow students to practice single functional group multistep aliphatic synthesis and the preparation of arenes with one or two substituents.

Infrared and proton nuclear magnetic resonance spectroscopy is introduced and practice provided in the identification of simple unknowns from their IR and NMR spectra. Spectroscopy is used throughout the programs in the development of functional group chemistry.

The relative reactivity of alkyl halides and the stereochemistry of bimolecular displacement reactions is demonstrated through simulated experiments and animations. Other simulated experiments include the determination of the mechanism of aromatic nitration, lithium aluminium hydride reductions, aldol condensations, the relative acidity of carboxylic acids, the hydrolysis of esters, and the product of the oxidation of a primary alcohol.

These disks include programs on the following: Alkanes and Alkenes, Substitution Reactions, IR and NMR Spectroscopy, Arenes, Alcohols, Aldehydes and Ketones, and Carboxylic Acids.

(A Demonstration Disk is Available)

GENERAL CHEMISTRY by Dr. Ruth Chabay and Professor Stanley Smith
Topics nearing completion include: The Periodic Table, Nomenclature, The Gas Laws, Chemical Reactions, Atomic Theory and Structure, and Chemical Bonding. Additional topics are being developed. Be sure you are on our mailing list to receive information about the complete set.
For more information about COMPress materials, write to COMPress, A Division of Science Books International, Inc., P.O. Box 102, Wentworth, NH 03282 or call 603-764-5831.

(See review of ORGANIC CHEMISTRY on opposing page)

*Trademarks of Apple Computer Co.

CIRCLE 137 ON READER SERVICE CARD

Mathematics B from SRA

Classroom Management System

Russell Zausmer

creative computing
SOFTWARE PROFILE
Name: Classroom Management System—Mathematics B
Type: Math
System: 48K Apple II Plus or 48K Atari 800
Format: disk
Language: Applesoft Basic
Summary: Straight A's
Price: $595
Manufacturer:
Science Research Associates
155 N. Wacker Dr.
Chicago, IL 60638

At the beginning of every school year, classroom teachers are faced with an awesome task: individualize instruction for the students in their classes. The average teacher has about 30 students in his classroom, so creating an Individualized Lesson Plan (I.L.P.) for each student in mathematics and reading is very time consuming. Every student must be tested, and each one placed in an appropriate group. A prescription must then be given to each student so that he may learn at his own pace. All this before the teacher has even begun to teach.

C.M.S. tests very specific skills defined by learning objectives.

While the educational concept is commendable, I.L.P. has placed a tremendous burden on the teacher. In many cases, teachers have become clerks and record keepers rather than instructors. Is there, then, any help for the classroom teacher who sees the value of individualized instruction?

Help is here! Science Research Associates (SRA) has produced a fine educational tool which harnesses the full power of the microcomputer. The courseware is called "Classroom Management System-Mathematics B." It is designed for students on a 4th through 8th grade level. The mathematics content includes: whole numbers—concepts; whole numbers—operations; fractions and mixed numerals—concepts; fractions and mixed numerals—operations; decimals—concepts; decimals—operations; ratio; proportion; percent; problem solving and estimation; geometry; measurement; and statistics and probability.

C.M.S. is a management system for classroom use that tests students, evaluates the tests, prescribes work to reinforce specific areas where the student is weak, and records both individual and class progress. C.M.S. can actually free the classroom teacher from the tasks associated with developing, administering and scoring tests. It will also free him from searching for appropriate remedial or enrichment materials, and from keeping records, while allowing him to individualize instruction for students who need extra help and for advanced students.

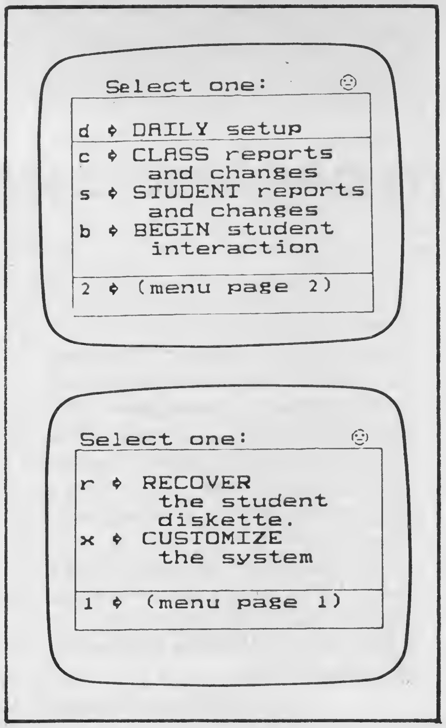
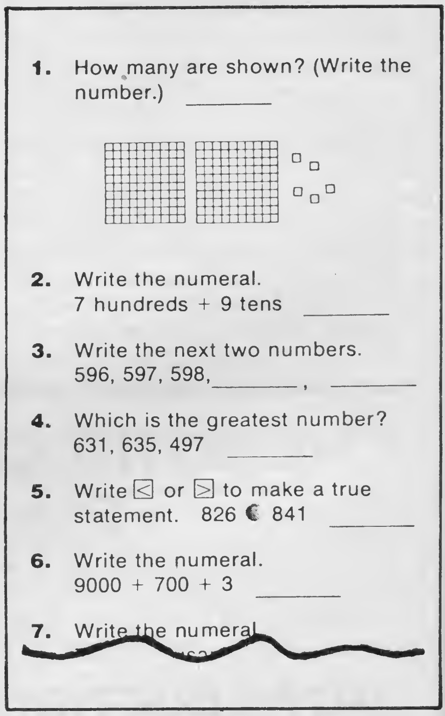

Select one:
d ◆ DAILY setup
c ◆ CLASS reports and changes
s ◆ STUDENT reports and changes
b ◆ BEGIN student interaction
2 ◆ (menu page 2)
Select one:
r ◆ RECOVER the student diskette.
x ◆ CUSTOMIZE the system
1 ◆ (menu page 1)

Figure 1.



1. How many are shown? (Write the number.) _______
2. Write the numeral.
   7 hundreds + 9 tens _______
3. Write the next two numbers.
   596, 597, 598, _______ , _______
4. Which is the greatest number?
   631, 635, 497 _______
5. Write < or > to make a true statement. 826 ○ 841 _______
6. Write the numeral.
   9000 + 700 + 3 _______
7. Write the numeral

Figure 2.

C.M.S. tests very specific skills defined by learning objectives. It evaluates each student's mastery of the objectives and pinpoints weaknesses. This system immediately scores, evaluates, and records all test scores and then routes the student to the next test or prescribes remedial work geared exactly to the objectives he has failed to master. The prescriptions are correlated with six major basal math

---

Russell Zausmer, P.S. 16, 80 Monroe Ave., Staten Island, NY 10301.

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SANTA CRUZ EDUCATIONAL SOFTWARE HAS WRITTEN A SERIES OF AFFORDABLE PROGRAMS THAT DEMONSTRATES MANY OF THE SPECIAL "TRICKS" THAT ONLY THE ATARI 400/800 COMPUTER IS CAPABLE OF DOING. WE OFFER EVERYTHING FROM A PROGRAM THAT DOES FANTASTIC HIGH RESOLUTION GRAPHICS TO ONE THAT ACTUALLY DIALS YOUR PHONE.....

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MASTER MEMORY MAP(tm) — This is really the key to using the ATARI'S capabilities. We start out by explaining how to PEEK and POKE values into memory so that even new programmers can use this. Then: we give you over 15 pages of the memory locations that are the most useful. The information is condensed from both the ATARI'S Operating System Manual and various articles and programs. It is, of course, useful even for experienced programmers as a reference. Also, we highly suggest that dealers offer this Memory Map to customers who request to be told how to use the power of the machine. We guarantee it will answer many of the questions you have about the machine.

$6.95

TRICKY TUTORIALS(tm)

#1: DISPLAY LISTS — This program teaches you how to alter the program in the ATARI that controls the format of the screen. For example: when you say graphics 8 the machine responds with a large graphics 8 area at the top of the screen and a small text area at the bottom. Now, you will be able to mix the various modes on the screen at the same time. Just think how nice your programs could look with a mix of large and small text, and both high and low resolution graphics. this program has many examples plus does all of the difficult caluculations! **$19.95**

#2: HORIZONTAL/VERITCAL SCROLLING — The information you put on the screen, either graphics or text, can be moved up, down or sideways. This can make some nice effects. You could move only the text on the bottom half of the screen or perhaps create a map and then move smoothly over it by using the joystick **$19.95**

#3: PAGE FLIPPING — Normally you have to redraw the screen every time you change the picture or text. Now you can learn how to have the computer draw the next page you want to see while you are still looking at the previous page, then flip to it instantly. You won't see it being drawn, so a complicated picture can seem to just appear. Depending on your memory size and how complicated the picture, you could flip between many pages, thus allowing animation or other special effects with your text. **$19.95**

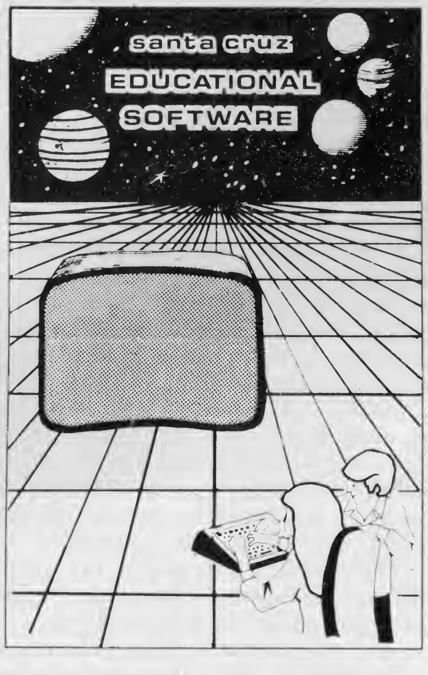
#4: BASICS OF ANIMATION — Shows you how to animate simple shapes using the PRINT and PLOT commands, and also has nice little PLAYER/MISSILE Graphics demo to learn. This would be an excellent way to start making your programs come alive on the screen. Recommended for new owners. $19.95

#5: PLAYER MISSILE GRAPHICS — Learn to write your own animated games and business applications! The Tutorial begins with many small examples that complement the 50 page manual, then gradually builds up to a complete game as everything you need to know is explained fully. Also included are two machine language routines that you can use to animate Players from Basic. Next we include one of the best editors currently available, one for Playfield shapes, and one for Player shapes. All of the examples and games run with 16K Tape or 32K Disk. The two utilities require 32K to run. **$29.95**

#6: SOUND — From explaining how to create single notes, to demonstrating complex four channel sound effects, this newest tutorial is great. Even those experienced with ATARI's sound capabilities will find the menu of sound effects a needed reference that can be used whenever you are in the need of a special sound for your programs. Everyone will learn something new! Written by Jerry White. **$19.95**

Tricky Tutorials (except #5) require 16K memory for cassette orders and 24K for disk. The price is $19.95 each. Tricky Tutorials #1 to 6 in a notebook cost only $99.95, a $30 savings.

THE GRAPHICS MACHINE!! — Turn your computer into an incredible graphics tool with advanced commands like circle, box, fill, polygon, line, help, etc. 3 colors in graphics 8 with instant text!!! Create colorful business charts or beautiful drawings and then save or retrieve them from disk in 5 SECONDS. YES, it's that fast. Needs all 48K, disk, and costs **$19.95**



MINI-WORD PROCESSOR — This is for those of you who have a printer, but don't want to spend $100 or more for a fancy word processor. It is suitable for simple editing of text, accepts most control characters for your printer, and text is stored on disk for easy retrieval. Holds 2½ typed pages at a time. Requires 32K, disk or tape. $19.95

BOB'S BUSINESS — 14 small business type programs for home or office, all chosen from a nice menu. Supports printed output. 169 sectors of output require 16K tape, or 32K disk **$14.95**

KID'S #1 — Includes the following: 1) TREASURE — search for the lost treasure while trying to keep from falling into the sea. Nice graphics if you find it!; 2)DIALOGUE — talk back to the computer about four subjects; 3) MATH QUIZ — Nice musical and graphical rewards for good scores. Parents input the level of difficulty.

KID'S #2 — A spelling quiz, a "scrabble" type game, and a version of Touch with the computer giving all the directions! Both Kid's programs require 16K tape or 24K disk and cost **$14.95** each.

MINI-DATABASE/DIALER — This unique new program stores and edits up to 8 lines of information such as name, address, and phone numbers, or messages, inventories or anything you want. It has the usual sort, search, and print options, but it also has an unusual feature: If your files include phone numbers and you have a touch-tone phone, the program will DIAL THE PHONE NUMBERS FOR YOU! This is perfect for those who make a lot of calls like salesmen, teens, or those trying to get through to busy numbers (acts as an auto-redialer). It is also a lot of fun to use. Requires 16K cassette or 24K disk and costs **$24.95**

FONETONE — For those who only want to store name and phone numbers and have the dialer feature as above, we offer this reduced version. Same memory requirements, but only costs **$14.95.** Don't forget you must have a touch-tone phone.

PLAYER PIANO — Turns your keyboard into a mini-piano and more. Multiple menu options provide the ability to create your own songs, save or load data files using cassette or diskette, fix or change any of up to 400 notes in memory, and play all or part of a song. The screen displays the keyboard and indicates each key as it is played from a data file or the notes you type. You don't have to be a musician to enjoy this educational and entertaining program. Requires 24K cassette or 32K disk. **$14.95**

BOWLERS DATABASE — Provides the league bowler with the ability to record and retrieve bowling scores providing permanent records. The data may then be analyzed by the program and displayed or printed in summary or detail form. Data may be stored on cassette or diskette and updated quickly and efficiently. The program proivdes such information as highest and lowest scores by individual game, (first, second, and third games throughout the season), high and low series, current average, and more. The program listing and documentation provided are a tutorial on ATARI basic and record keeeping. Requires 16K for cassette or 24K for disk. **$14.95**

#7: DISK UTILITIES TUTORIAL — This Tutorial both offers you several programs to aid in the use of your 810 Disk drive, and teaches you how these utilities were written at the same time. The utilities included are a Menu program, a Disk inspector (look at sectors on the disk), a Disk Directory printout program, a Format utility to quickly format large numbers of disks, and a utility that allows your programs to start running by just turning on the 810 (Autorun.sys). Requires 32K of memory and costs only **$29.95**

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CIRCLE 138 ON READER SERVICE CARD

textbooks used in schools throughout the country and with many SRA supplementary programs. The teacher can select any or all of the references.

Customizing the Program

The first time the system is used the classroom teacher inputs or "customizes" the "Teacher Diskette." The teacher types in the class name, his own name, and a code word which allows only the teacher access to the recorded information.

The next step is to use the Student Diskette to record each individual student in the class (maximum of 40 students). Information such as name, age, I.D. number, and nickname are entered here. To enter a class of 40 students takes about half an hour, and is the most typing you will do! (See Figure 1.)

Once the teacher has entered the class information, he begins to enter information for the most useful part of C.M.S.: the Reference Diskettes. These diskettes allow the teacher to specify from which textbook he would like to take prescriptions (six major texts are already correlated with the program) and which SRA supplementary materials should be correlated. The instructor can also specify his own materials, special kits, games, other textbooks, or any other educational tool.

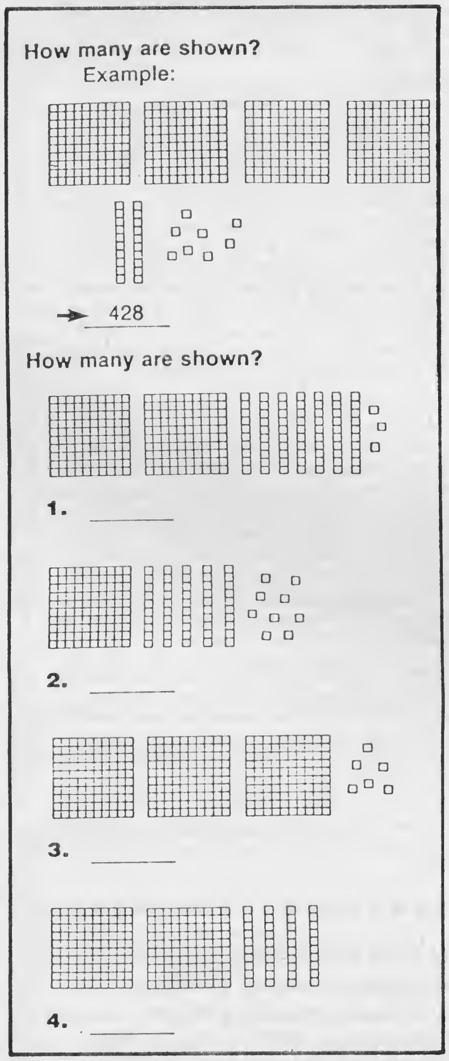
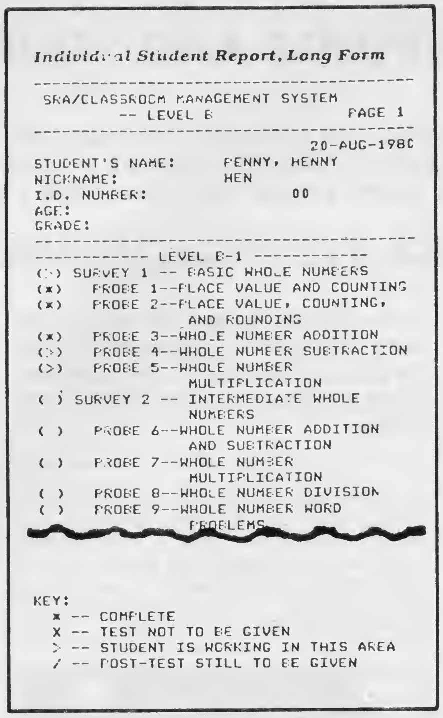

How many are shown?
Example:
428
How many are shown?
1.
2.
3.
4.

Figure 3.


Individual Student Report, Long Form

```
---------------------------------------
 SRA/CLASSROOM MANAGEMENT SYSTEM
       -- LEVEL B                PAGE 1
---------------------------------------
                            20-AUG-1980
STUDENT'S NAME:       PENNY, HENNY
NICKNAME:             HEN
I.D. NUMBER:                00
AGE:
GRADE:
---------------------------------------
----------- LEVEL B-1 ------------
(/) SURVEY 1 -- BASIC WHOLE NUMBERS
(*)   PROBE 1--PLACE VALUE AND COUNTING
(*)   PROBE 2--PLACE VALUE, COUNTING,
               AND ROUNDING
(*)   PROBE 3--WHOLE NUMBER ADDITION
(/)   PROBE 4--WHOLE NUMBER SUBTRACTION
(>)   PROBE 5--WHOLE NUMBER
               MULTIPLICATION
( ) SURVEY 2 -- INTERMEDIATE WHOLE
               NUMBERS
( )   PROBE 6--WHOLE NUMBER ADDITION
               AND SUBTRACTION
( )   PROBE 7--WHOLE NUMBER
               MULTIPLICATION
( )   PROBE 8--WHOLE NUMBER DIVISION
( )   PROBE 9--WHOLE NUMBER WORD
               PROBLEMS


KEY:
  * -- COMPLETE
  X -- TEST NOT TO BE GIVEN
  > -- STUDENT IS WORKING IN THIS AREA
  / -- POST-TEST STILL TO BE GIVEN
```

Figure 4.

There are four "open" spots in the program that allow this to be done easily by following the excellent instructions in the guide. Therefore, the teacher is not locked into using any specific textbook or material. If a new book comes in, he can add it to the correlations.

Now the system is customized for the class and the teacher can start the "student interaction" phase of the program.

The student's tests are in two parts, Surveys and Probes. In the teacher's guide all Survey and Probe tests are reproduced so that the instructor may make paper copies for the students. This saves computer time. The students can work the problems on paper and then enter them into the computer when their time is scheduled. The Surveys test broad areas of mathematical skills. The Probes pinpoint specific areas of weakness. Students are routed to the Probes through the Surveys.

Using the Program

Let's say that a student, Brian, is assigned to take Survey 1. (See Figure 2.) Brian inserts the student diskette and is asked to enter his name. If this matches a name stored on the diskette by the teacher, he can then enter his password. If this password also matches he will be routed to the Survey 1 diskette, which contains the first survey test. If Brian does not type in the correct information he will be asked to try again. He will have three chances to enter the information correctly, after which he will be told to "see your teacher."

When question 1, of Survey 1, appears on the screen, Brian types in his answer. A correct response will receive an "O.K."; a wrong answer a "NO." Then Brian will proceed to the next question. Some questions may be skipped, depending on how well he does; this is called the "abbreviation mode" and is used when a student is not doing well. It stops the student from becoming frustrated and saves time. After Brian is done, the computer routes him to the next survey test, if he missed no problems, or sends him on to the applicable probe test.

It should be noted that C.M.S. was not meant to teach. It is a management tool.

In this example Brian missed only one question—question 1. Therefore the computer has told him to go to Probe 1 where he will work on only those questions which relate to the missed question (See Figure 3). He will now be tested even further on his weakness.

If he should miss a question in a probe, a prescription will be given. He might be told to go to page 30 of one of the math texts or to do a certain teacher-made activity, or anything else that correlates with the area missed. The assigned prescription is recorded and should be given to the teacher. After the teacher feels that Brian has mastered the material, he will be sent back to the computer and tested only on that section of the probe that he missed.

If Brian fails in this second attempt a "double fault" mode is set up. Brian must bring his teacher back to the computer to type in a special code to allow him to continue with the probes or surveys. This insures that he must master any weak areas before he can continue with C.M.S.

As part of the customization of C.M.S. by the classroom teacher, he could choose to skip certain surveys or probes for the whole class or individually by student. Also the teacher may decide whether the student should be assigned a prescription as soon as a problem is missed or only when the test is completed.

Are you ready to step into the world of

Wizardry

TM

The Ultimate Fantasy Experience

Wizardry—a revolutionary game for your APPLE II computer. Never before has a game done so much, so well, so fast! Groups of up to 6 adventurers explore a deep and mysterious maze in search of loot and glory. Brawny fighters, frail mages, nimble thieves, all must cooperate to survive. Not only must you battle hordes of monsters, but you must also solve the secret riddles hidden in the mazes. Starting from the safety of the castle, you must map the 3D maze as you move through it, swiftly running down the corridors and smashing through doors! Suddenly you encounter a group of monsters in their hideous lair! Leaping to the attack, swords swinging, your fighters wreak havoc amongst the monsters! Mages utter spells, causing destruction! Thieves skulk around in the corners, and priests attempt to bring the blessings of the gods upon your party! After the melee, there may be a chest to open, traps to evade, and loot to be divided!

A partial list of Wizardry features includes—A 10 level maze—8 character classes—5 races—20 stored on disk—3D maze display—complete castle—hundreds of monsters and magic items—monsters appear in mixed groups—50 castable spells, usuable by players, magic items and even monsters—44 page illustrated manual and much, much more all for $49.95 (N.Y. residents add sales tax).

But don't take our word for it, *Wizardry* received reviews in the May issue of *Creative Computing*, the April issue of *Popular Mechanics*, page 38, and the August issue of *Softalk* magazine.

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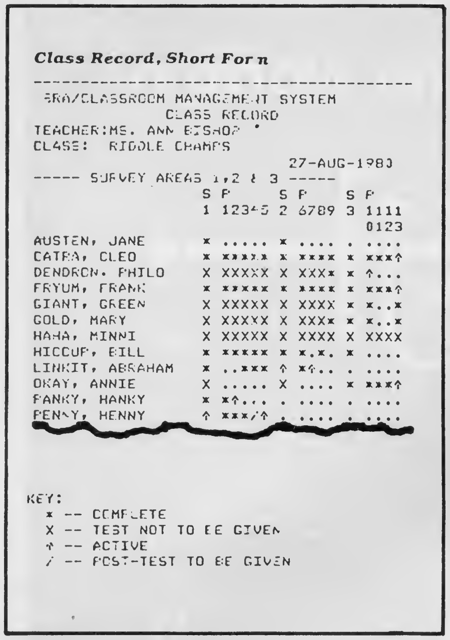


Class Record, Short Form

```
----------------------------------------
 SRA/CLASSROOM MANAGEMENT SYSTEM
             CLASS RECORD
TEACHER:MS. ANN BISHOP
CLASS:  RIDDLE CHAMPS
                              27-AUG-1980
----- SURVEY AREAS 1,2 & 3 -----
                     S P     S P    S P
                     1 12345 2 6789 3 1111
                                      0123
AUSTEN, JANE         * ..... * .... . ....
CATRA, CLEO          * ***** * **** * ***↑
DENDRON, PHILO       X XXXXX X XXX* * ↑...
FRYUM, FRANK         * ***** * **** * ***↑
GIANT, GREEN         X XXXXX X XXXX * *..*
GOLD, MARY           X XXXXX X XXX* * *..*
HAHA, MINNI          X XXXXX X XXXX X XXXX
HICCUP, BILL         * ***** * *.*. * ....
LINKIT, ABRAHAM      * ..*** ↑ *↑.. . ....
OKAY, ANNIE          X ..... X .... * ***↑
PANKY, HANKY         * *↑... . .... . ....
PENNY, HENNY         ↑ ***/↑ . .... . ....

KEY:
  * -- COMPLETE
  X -- TEST NOT TO BE GIVEN
  ↑ -- ACTIVE
  / -- POST-TEST TO BE GIVEN
```

Figure 5.

Now that our student, Brian, is done with his C.M.S. assignment, his teacher might like to review his records. The teacher can call up, via the screen or printer routine, the following choices for class reports: a) Class List—a simple list of all students in the class; b) Survey/Probe Status Report—a graphic list of each student and his status on all Survey/Probe areas; c) Individual Student Report—long form report with content areas and status (good report for consulations with parents); d) Class Record—lists all students in the class and shows their status on every Survey/Probe; e) Grouping Report—lists all students who are currently working on the same probes (perfect for "grouping" a class for small group instruction); f) Graphic Graph Grouping Report—shows a bar graph for all the probes and number of students working on each probe; g) Prescription Reports—these are the same reports the students get for their next assignment (See Figures 4, 5, and 6).

Evaluation

In actual use with a fourth grade class C.M.S. was very easy to use, and required no previous computer knowledge. The 170-page teacher's guide is quite thorough. You are led step-by-step through all phases of operation for both the program and the computer. There is even a section for teaching the students a little "computerese"; complete with computer riddles. The program takes advantage of the graphics capabilities of the Apple and Atari and the on-screen directions to the student are clear and easy to follow. A little smiling face lets a student know that he is operating the computer correctly and a frowning face signals him to try again. The program runs very smoothly and has never "crashed."

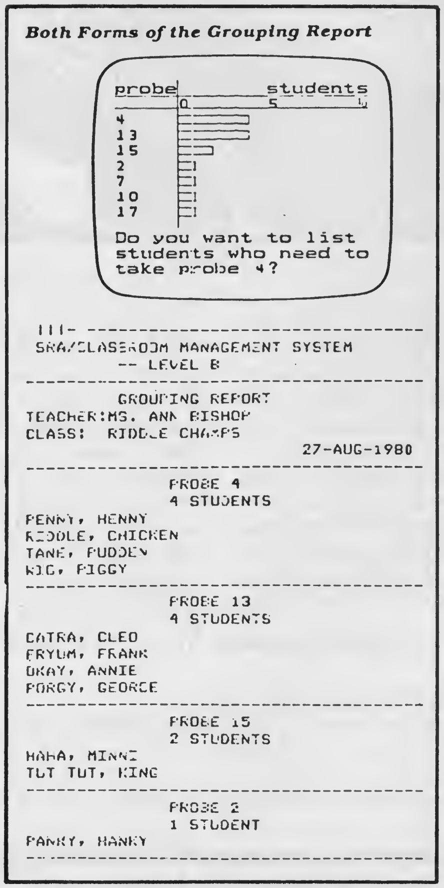
There are, however, a few problem areas. When a student misses a problem the correct answer is not given and there is no tutorial. However, it should be noted that C.M.S. was not meant to teach. It is a management tool.

A more serious problem has nothing to do with program content, but with the management of the program diskettes.

SRA has chosen to put the "management portion" of the courseware on a separate diskette. This program is set up for a one-disk-drive system. Not only does this necessitate the constant swapping of diskettes, but a more serious flaw quickly becomes apparent. SRA has envisioned one computer per classroom, and the system works fine in that environment. But most schools cannot afford to have one computer per classroom. Instead they have a computer room, with many computers being shared by all the classes in the school.

C.M.S. does not work very well under these conditions, because SRA has not provided a way to transfer student data and records from one diskette to another. Therefore, if you have one class sharing five computers, and you wish to have the entire class operate C.M.S. on a rotating basis, there is no way to transfer student data from the master student diskette to another student diskette. The teacher can make a duplicate student diskette—two are provided—but this merely makes a back-up disk.

SRA does sell a management package consisting of one teacher disk and two extra student diskettes for $250, but this does not solve the problem. It simply allows you to use the courseware with another class, keeping separate records. You still cannot "merge" the separate student data to compile one master class record. A data transfer routine should be provided by SRA.



Both Forms of the Grouping Report

```
Do you want to list
students who need to
take probe 4?
```

```
III- ------------------------------------
 SRA/CLASSROOM MANAGEMENT SYSTEM
       -- LEVEL B
----------------------------------------
        GROUPING REPORT
TEACHER:MS. ANN BISHOP
CLASS:  RIDDLE CHAMPS
                             27-AUG-1980
----------------------------------------
               PROBE 4
               4 STUDENTS
PENNY, HENNY
RIDDLE, CHICKEN
TANE, PUDDEN
WIG, PIGGY
----------------------------------------
               PROBE 13
               4 STUDENTS
CATRA, CLEO
FRYUM, FRANK
OKAY, ANNIE
PORGY, GEORGE
----------------------------------------
               PROBE 15
               2 STUDENTS
HAHA, MINNI
TUT TUT, KING
----------------------------------------
               PROBE 2
               1 STUDENT
PANKY, HANKY
----------------------------------------
```

Figure 6.

The use of this program in the classroom allows every child in the school to have true individualized instruction in mathematics, while allowing teachers time to do what they do best—teach.

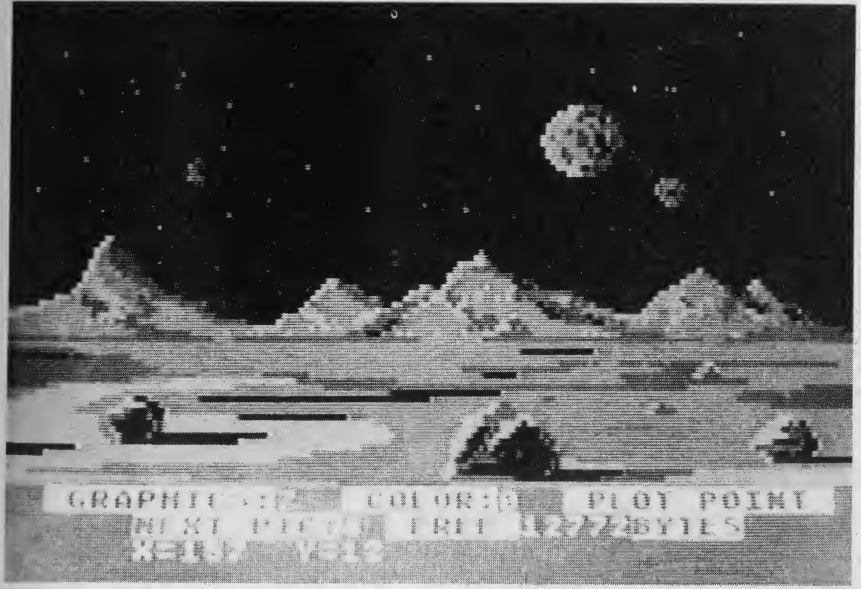
Another unfortunate feature of this courseware is that the school does not buy it; the school must pay a "license fee." A license arrangement usually provides better protection for the company than for the user. Also, since this program is copy-protected, its use is limited to 40 students per student diskette. I hope that SRA's license agreement will be modified to allow a reduction in price for an entire school which would like to use C.M.S.

Although most educational computer software is far from perfect, this package comes very close. It is one educational software set that deserves an unequivocal "A." SRA has spent much time developing this comprehensive program, and it shows. The use of this program in the classroom allows every child in the school to have true individualized instruction in mathematics, while allowing teachers time to do what they do best—teach.

I believe that what Visicalc has done for business software, "C.M.S.-Mathematics B" will do for educational software.

SRA's C.M.S.-Mathematics A" (grades 1-3) should be available in the fall. They are also developing a similar set to improve reading skills. ☐

ARTWORX. IT'S A WHOLE NEW WORLD OF SOFTWARE.



Scene from BETA FIGHTER during creation using the DRAWPIC graphics editor.

HODGE PODGE: by Marsha Meredith (Atari and Apple)
NOW AVAILABLE FOR ATARI!!! This captivating program is a marvelous learning device for children from 18 months to 6 years. HODGE PODGE consists of many cartoons, animation and songs which appear when any key on the computer is depressed. A must for any family containing young children.
PRICE. . . . .$19.95 diskette

☐ **PM EDITOR:** by Dennis Zander (Atari, 16K)
Create your own fast action graphics game for the Atari 400 or 800 using its player missile graphics features. By using player data stored as strings, players can be moved or changed (for animation) at machine language speed. All this is done with string variables (PO$(Y)=SHIP4). This program is designed to permit creation of up to 4 players on the screen, store them as string data and then immediately try them out in the demo game included in the program. Instructions for use in your own game are included. PM EDITOR was used to create the animated characters in **ARTWORX** RINGS OF THE EMPIRE and ENCOUNTER AT QUESTAR IV.
PRICE . . . . **$29.95** cassette **$33.95** diskette

☐ **ROCKET RAIDERS** by Richard Petersen (Atari 24K)
Defend your asteroid base against pulsar bombs, rockets, lasers, and the dreaded "stealth saucer" as aliens attempt to penetrate your protective force field. Precise target sighting allows you to fire at the enemy using magnetic impulse missiles to help protect your colony and its vital structures.
PRICE . . . . **$19.95** cassette **$23.95** diskette

☐ **FOREST FIRE!:** by Richard Petersen (Atari,24K)
Using excellent color graphics, your Atari is turned into a fire scanner to help you direct operations to contain a forest fire. You must compensate for changes in wind, weather and terrain. Not protecting valuable property can result in startling penalties. Life-like variables make FOREST FIRE a very suspenseful and challenging simulation. **PRICE** . . . . **$16.95** cassette **$20.95** diskette

☐ **GIANT SLALOM:** by Dennis Zander (Atari, 16K)
Bring the Winter Olympics to your computer anytime of the year! Use the joystick to guide your skier's path down a giant slalom course consisting of open and closed gates. Choose from three levels of difficulty. Take practice runs or compete against from two to eight additional skiers.
PRICE . . . . **$15.95** cassette **$19.95** diskette

☐ **THE PREDICTOR** by Thomas Barker
(Apple, Atari, TRS-80, North Star and CP/M (M-BASIC).
This is a complete package that covers least squares fitting of parameters for two or more variables. THE PREDICTOR can be used for predicting sales and process behavior, trend analysis, model building and many other uses calling for multilinear regression techniques. Each option in the program is prompted with simple YES/NO commands making it **very** easy to use.
PRICE . . . . **$29.95** diskette

☐ **PILOT:** by Michael Piro (Atari, 16K)
Pilot your small airplane to a successful landing using both joysticks to control throttle and attack angle. PILOT produces a true perspective rendition of the runway, which is constantly changing. Select from two levels of pilot proficiency.
PRICE . . . . **$16.95** cassette **$20.95** diskette

☐ **TEACHER'S PET:** by Arthur Walsh (Atari, Apple, TRS-80, PET, North Star and CP/M (MBASIC) systems).
This is an introduction to computers as well as a learning tool for the young computerist (ages 3-7). The program provides counting practice, letter-word recognition and three levels of math skills.
PRICE . . . . **$14.95** cassette **$18.95** diskette

☐ **MAIL LIST 3.0:** (Atari, Apple and North Star)
The very popular MAIL LIST 2.2 has now been upgraded. Version 3.0 offers enhanced editing capabilities to complement the many other features which have made this program so popular. MAIL LIST is unique in its ability to store a maximum number of addresses on one diskette (typically between 1200 and 2500 names!). Entries can be retrieved by name, keyword(s) or by zip codes. They can be written to a printer or to another file for complete file management. The program produces 1, 2 or 3-up address labels and will sort by zip code (5 or 9 digits) or alphabetically (by last name). Files are easily merged and MAIL LIST will even find and delete duplicate entries! The address files created with MAIL LIST are completely compatible with **ARTWORX** FORM LETTER SYSTEM.
PRICE . . . . **$49.95** diskette

☐ **THE VAULTS OF ZURICH:** by Felix and Greg Herlihy (Atari, 24K, PET)
Zurich is the banking capital of the world. The rich and powerful deposit their wealth in its famed impregnable vaults. But you, as a master thief, have dared to undertake the boldest heist of the century. You will journey down a maze of corridors and vaults, eluding the most sophisticated security system in the world. Your goal is to reach the Chairman's Chamber to steal the most treasured possession of all: THE OPEC OIL DEEDS!
PRICE . . . . **$21.95** cassette **$25.95** diskette

☐ **BRIDGE 2.0** by Arthur Walsh (Atari (24K), Apple TRS-80, PET, North Star and CP/M (MBASIC) systems)
Rated #1 by Creative Computing, BRIDGE 2.0 is the only program that allows you to both bid for the contract and play out the hand (on defense or offense!). Interesting hands may be replayed using the "duplicate" bridge feature. This is certainly an ideal way to finally learn to play bridge or to get into a game when no other (human) players are available.
PRICE . . . . **$17.95** cassette **$21.95** diskette

☐ **ENCOUNTER AT QUESTAR IV:** by Douglas McFarland (Atari, 24K)
As helmsman of Rikar starship, you must defend Questar Sector IV from the dreaded Zentarians. Using your plasma beam, hyperspace engines and wits to avoid Zentarian mines and death phasers, you struggle to stay alive. This BASIC/Assembly level program has super sound, full player missile graphics and real time action.
PRICE . . . . **$21.95** cassette **$25.95** diskette

NEW PROGRAMS!

HAZARD RUN: by Dennis Zander (Atari, 16K)
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Games for Clods

Computer Games for People Who Hate Computer Games

David H. Ahl and Betsy Staples

We're hooked. We never thought we'd see the day when a daily fix of *Cosmic Fighter* or *Tsunami* would temporarily banish all ills. We never envisioned the development of a rift in our relationship over who got to play which game. We never thought we would postpone dinner for hours while we played "just one more game." We never even imagined that we would score enough points to earn an extra ship.

But all these things have happened in the past few months since we discovered that you don't have to be a fanatic with the hand/eye coordination of a major league baseball player to enjoy computer games.

Don't misunderstand; we're not particularly good at these games, and our game playing associates around the office still laugh when we announce our all-time-high scores. These scoffers are the same ones who complain that "the game doesn't get any harder after you get 100,000 points." They are the ones who compare notes on "the really tough zilchbats that finally wiped me out on level 87."

This article is not for them. This article is for people who may not have discovered the fun lurking in their Apples, Ataris, TRS-80s and VICs. It is also for people who are looking for a way to interest family and friends in the wonderful world of personal computing.

What Makes A Good Game

The games we have chosen to recommend here are not necessarily easy, nor are they boring for our more advanced fanatic friends. The main thing they have in common is the ability to provide positive feedback to the player. You won't find listed here any game that after three seconds of "play" leaves you sitting in a cloud of stardust staring at "GAME OVER" and wondering what happened.

Computer games, like all games, require practice, and your first score may not be the one you want to write home about, but we found that the games mentioned here had a reasonable learning curve for most people and that they were sufficiently appealing that most members of our panel were willing—if not eager—to keep playing until they achieved a satisfying score. Having achieved a satisfying score, most wanted to keep playing until they had beaten it. (In the course of our research, we discovered an important axiom of computer game play: there are few things as boring and insignificant as the second-highest score.)

A noble gesture for an expert to make would be to offer to erase the scoreboard when playing with a novice.

Since the score is the measure of success in most of these games, we found that games which not only saved the highest score of the session, but maintained one or more high scores on disk, kept drawing us back day after day to strive for better and better performance. The Big Five games, which store the top ten scores on disk, are by far the best we have seen with this feature.

The drawback to this system is that once one or two players perfect their skills and fill the permanent scoreboard with relatively high scores, a novice player can be discouraged. In essence, the "cost of entry" has become too high. A noble gesture for an expert to make would be to offer to erase the scoreboard when playing with a novice.

Another feature that makes a game appealing to a learner is the ability to proceed through the various levels of the game with less than perfect performance. Games that present a new board or a new set of alien creatures each time the player's base or ship is destroyed are far more rewarding than those in which he simply picks up where he left off. A true game clod can play for hours before he gets his first glimpse of even the second species of attacker in some games. He can then look forward to many more hours of frustration before he sees a third. If he is like some of us, he may never see anything beyond the first level.

It is also worth mentioning that games which are relatively easy at the beginning get the clod vote. Even if each invader is worth fewer points, we clods like to start off at a leisurely pace so that we have at

Games For People Who Hate Computer Games

Computer/Game	Manufacturer
TRS-80	
Cosmic Fighter	Big Five Software
Galaxy Invasion	Big Five Software
Meteor Mission	Big Five Software
Scarfman	Cornsoft Group
Apple	
ABM	Muse
Apple—oids	California Pacific Computer Co.
The Asteroid Field	Cavalier Computer
Asteron	Western Micro Data
County Fair	Datamost
David's Midnight Magic	Broderbund Software
Escape From Arcturus	Synergistic Software
Jaw Breaker	On-Line Systems
Missile Defense	On-Line Systems
Phantoms Five	Sirius Software
Snack Attack	Datamost
Sneakers	Sirius Software
Super Invader	Creative Computing
Torax	Creative Computing
Tsunami	Creative Computing
VIC-20	
Slot Machine	Commodore
VIC Avenger	Commodore

least a few points to show for our early efforts.

Now for the recommendations. Each of these games was played by at least two clods and received a vote from at least one of them. Most of the games also have fans among our more experienced and dexterous associates; they simply play at a different level and don't discuss their scores with us.

Needless to say, we have just scratched the surface of games for people who hate computer games. If there is sufficient interest, this subject will become the subject of a regular column in *Creative Computing*.

Readers: if you have a favorite game or two that you think ought to be included in this column, drop us a line noting the name of the game and manufacturer.

Manufacturers: if you would like us to review your software for this column or any other part of Creative Computing, please send a copy to Betsy Staples, Editor, Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950.

TRS-80

Cosmic Fighter

Cosmic Fighter started the whole thing. Before we received *Cosmic Fighter*, we left all arcade game reviews to the younger, more fanatic game players on the staff. Since our success with *Cosmic Fighter* and its relatives, we have joined the scramble to try out each new game package that arrives.

Cosmic Fighter features four types of aliens. The good thing about them is that there are not many of them in each wave—between 9 and 20. There are, of course, the mandatory bombs to be avoided while shooting at the invaders.

The player moves his ship back and forth using the arrow keys, and shoots with the spacebar. An extra ship is awarded for every 10,000 points scored.

The first onslaught can be dispatched by hitting each alien once. The second onslaught requires two hits, the third three hits, and the fourth and subsequent ones four hits.

In each onslaught, the player sees one wave of each type of alien and one nasty little flagship. The flagship is deadly and must be eliminated at once. If any of the aliens in a given wave succeed in getting by the player's ship, a new wave starts at the top of the screen, and the ship is moved up about an inch, making it even harder to clear the screen.

After the player has eliminated an entire onslaught of aliens, he must dock with his mother ship for refueling. This is perhaps the trickiest part of the game, since a flagship must be eliminated before the player's ship can be docked in the very small space provided.

Clods, continued...

Adding to the excitement is the fact that fuel is consumed each time the player shoots or moves his ship. If he runs out of fuel, the game is over.

Cosmic Fighter can be played by one or two people. In the two player mode, play alternates after each ship is destroyed. This eases the tension of the game a bit, but we prefer to alternate full games.

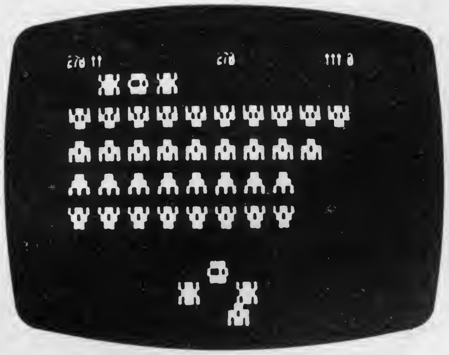
Galaxy Invasion

Galaxy Invasion is another offering from Big Five. It, too, is played with the left and right arrow keys and the spacebar.

This is a Galaxian-type game in which a corps of aliens marches back and forth across the screen dropping bombs. Periodically, one or more aliens leave the formation and attack the player's ship. If an alien is hit while attacking, the player scores double points.

The dreaded flagships appear again, in *Galaxy Invasion*. They are worth large numbers of points if hit while attacking, but their evil nature becomes apparent when they stage a "Flagship Alert," during which the player must shoot one of them quickly or be eliminated himself.

Each time the screen is cleared, a new group of aliens appears, and as the score mounts, more flagships join the attackers and stage more frequent alerts. The player wins an extra ship with each 10,000 points.



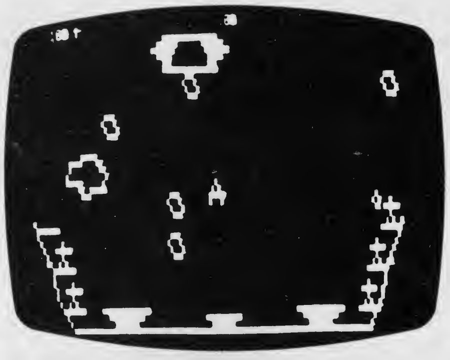
Galaxy Invasion.

The two-player mode in *Galaxy Invasion* is the same as in *Cosmic Fighter*.

Meteor Mission

In *Meteor Mission*, the player has a mother ship constantly making passes back and forth across the top of the screen, supposedly over the surface of a planet where astronauts are stranded. Inside the mother ship is a small drone which may be released by pressing the space bar and guided down by pressing the right and left arrow keys to land on one of three landing pads.

After a successful landing, a stylized astronaut runs to the drone lander (accompanied by delightful sound effects). The drone immediately takes off and the player must navigate back to the mother ship.



Meteor Mission 2.

Sounds easy enough, right? But there is one catch: meteors of various sizes are drifting across the screen. Toward the beginning of the mission there are very few meteors and it is easy to navigate through them. However, as the game progresses more meteors appear and they must be blasted out of the way. Unfortunately the blaster works only while going up. To set down successfully with a full field of meteors requires deft steering and use of the retro-rockets.

The game starts with fairly large landing pads which get progressively smaller each time they are used. However, at the end of three uses the large landing pads are once again restored. One thousand bonus points are awarded for successfully rescuing six astronauts in a row, and extra drones are awarded for each 10,000 points. *Meteor Mission* is an easy game to play and wrings the maximum in graphics and sound out of a trusty TRS-80 Model I or III.

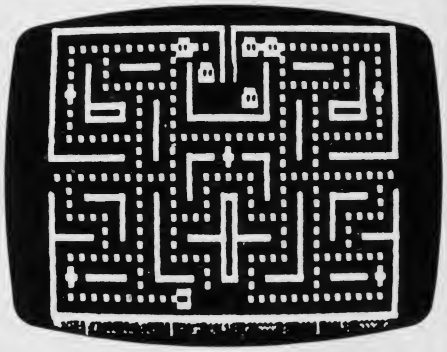
Scarfman

This TRS-80 PacMan imitation from the Cornsoft Group is played with either the four arrow keys on the keyboard or an Alpha Products Joystick. The game provides excellent sound effects through the cassette port.

PHIL'S ARCADE
RABBIT INVADERS
RABBIT INVADERS
RABBIT INVADER

"That's funny!--When I left here yesterday, there was only one machine!!..."

There are five "monsters" that start in a chute at the top of the screen and come out and roam around almost immediately. There are five plus signs located at different points in the maze. Each time the Scarfman eats a plus, the monsters lower their eyes, slow down and try to run away from the Scarfman. This only lasts for a short while; then they revert to predatory monsters. We found it a little difficult to recognize, in the heat of the game, whether a monster had his eyes up or down.



Scarfman.

The way to win is to clear the board as many times as possible. Each time the board is cleared, the level of difficulty changes: the monsters get better at finding or hiding from the Scarfman, and they revert back to monsters after eating a plus sign in a shorter period of time.

APPLE II

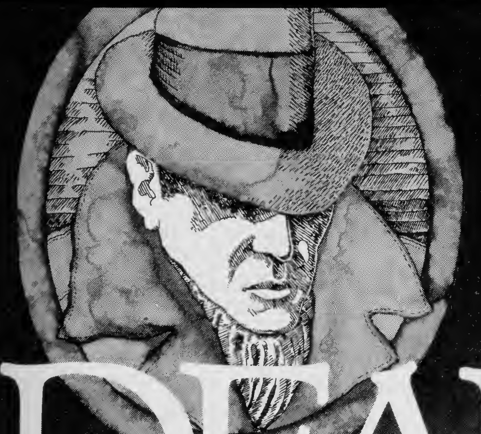
Tsunami

Tsunami has one of the most extensive menus we've seen since the local diner burned down last year. One to four people can play two different sets of three variations on two skill levels. The player can also choose which paddle to use and whether to turn the sound on or off.

For clods, we recommend variation 1, game set A, beginner level. The first wave of creatures (which look like a cross between a seagull and a starburst) weave tantalizingly across the screen dropping bombs as they go. If you get the rhythm of their motion right and avoid their bombs, they can be dispatched without much difficulty. If you eliminate them before your fuel runs out, you get extra points; if the fuel runs out first, you lose your base.

There are eight different "battle situations," each of which offers a different-shaped creature and a slight variation in behavior. Some of the aliens simply disappear in a cloud of dust when hit; others plummet earthward and can squash your base.

Once you have mastered game set A of variation 1 (the eight "battle situations" repeat), try game set B which introduces shifting barriers and bouncing aliens in basically the same formations presented in A.



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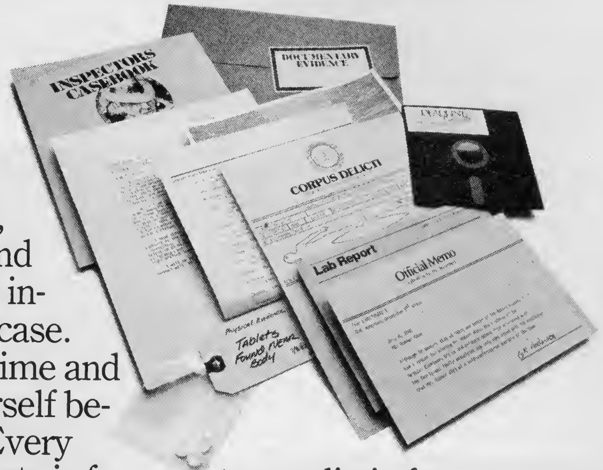

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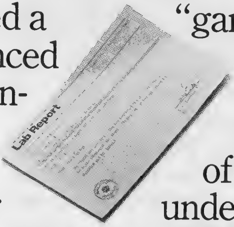

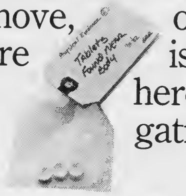

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Confessions of a Clod

I am a games clod. Oh yes, I wrote Hammurabi and Lunar Lander and a whole bunch of other games and edited two best selling games books, but compared to the video games and computer games of today, the games in these books are like a 1950 Ford compared to a Brabbham BT 49C Grand Prix car.

My mother is a games clod too. So is my father. In fact, so are both of my daughters. Oh yes, both of them are in the "gifted and talented" program in school, but when it comes to video games, they are clods.

Other games clods I know are: Betsy Staples, the editor of this fine magazine; her parents; my doctor; my dentist; his assistant; my secretary; the editor of *Microsystems*; and on and on.

You might say to yourself, "These are not dumb people. Why are they games clods?"

There is no simple answer. Some people just plain don't like games. Other people just plain don't have any hand/eye coordination. But by far and away the majority of people do, in fact, enjoy games, but feel like clods when they play.

They feel like clods because they see other people playing the games better than they. They feel like clods because they see astronomical scores recorded on the opening of the game and get shot down in the first wave of alien invaders with a score 1/100th as high as the top score.

> ***I want to feel good about my game playing ability or at least not feel frustrated by a lack thereof.***

Or, they feel like a clod when someone else who knows the game is hanging over their shoulder giving them tips on how to avoid the oncoming missiles or other obstacles when they wish that he would just shut up and go away.

In my case, I feel I can "afford" perhaps an hour a week to play games. At the end of that hour (or four periods of fifteen minutes each) I want to feel like I have had some fun. I don't want to feel frustrated. I don't want to spend hours practicing the first level of a game just to get to the second level where I have to spend hours practicing to get to the third level and so on. I want to have fun. I want to feel good about my game playing ability or at least not feel frustrated by a lack thereof.

That is not to say that I am looking for an "easy" game. I am looking for a game that is interesting, challenging, fun, but, above all, one that is approachable. It may well have more than one skill level. Preferably it is one with skill levels that do not advance faster than I advance.

I don't think these requirements are far different from those that the other clods mentioned at the beginning of this article would also be looking for in a game. —DHA

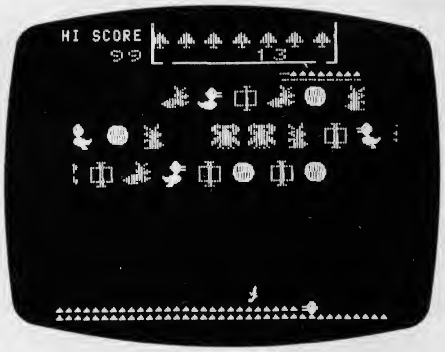
Just for the record (not because we recommend them for clods), the creatures in variation 2 fly about in impossible patterns and usually pulverize you before you have a chance to get off a shot. Variation 3 combines situations from 1 and 2.

We especially like *Tsunami* because it allows you to move to the next level after your ship is destroyed (provided, of course, you have another one left). This at least allows you to practice on more than one type of creature. *Tsunami* saves the highest score of the session in memory, but not on disk—very disappointing.

County Fair

In this colorful game the player has a small pistol at the bottom and a limited supply of ammunition. Using the paddle knob to control the right/left movement of the pistol, he attempts to shoot three rows of targets in this video shooting gallery.

The top and bottom rows move from left to right across the screen while the center row moves from right to left. The targets consist of cute little creatures such as green rabbits, white ducks, multi-colored beach balls, and several unidentifiable objects. Unfortunately, the white ducks are predators and, every once in a while, one leaves the bottom row and jumps down one row further. The player must shoot him quickly at this point or he will jump down another row and gobble up some of the ammunition.



County Fair.

The player has a way of regaining ammunition, but it is somewhat perilous. Every so often a row of bullets appears at the top of the screen preceded by either a plus or minus sign. If the player can shoot that row, it is added to his ammunition supply. This is perilous because, frequently in his eagerness to shoot a row of bullets, one forgets to note whether there was a plus or minus sign preceding it. A minus sign, needless to say, takes away the displayed amount of ammunition from the player's supply.

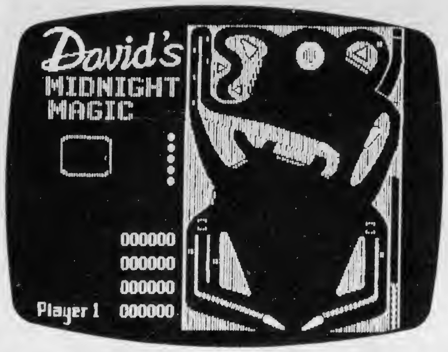
In addition to the three rows of "large" targets, there is also a bonus row of small, colored pine trees moving from right to left across the top of the screen. However, there are only two very small openings through which these trees can be shot. We found it extremely frustrating trying to adjust the paddle controls to shoot in these holes. Even with Super Paddles from Peripherals Plus, aiming was a rather imprecise art. However, that is part of the fun of the game: the paddle controls are more sluggish than they are in games like Galaxian or Super Invader.

If a player succeeds in shooting all the targets on the screen, including the rows of pine trees at the top, he can use his remaining ammunition to shoot one little white duck flitting about the screen and collect ten times the normal point value for each hit. After five shots, the game starts over with another round. The game ends when the player runs out of ammunition. This is altogether a delightful game and one which was enjoyed by all members of our game playing panel.

David's Midnight Magic

This simulated pinball game on the Apple has a complex, interesting playing surface with two sets of flippers, one at the bottom of the screen and one about one-third of the way down from the top. Each player gets five balls and may pull the "plunger" back a certain distance as set on the paddle controller. Beyond that the only controls are the two paddle buttons, one of which controls the left hand pair of flippers (top and bottom) and the other of which controls the right pair. The game is complete with power bumpers at the bottom, alleyways that endow a ball with the ability to achieve double or triple scores, and special features such as a curved pathway at the top which, after three balls enter, releases them all at once.

We have two people in the office who for years avoided the temptation to play computer games. However, this was the icebreaker which lured even them to partake of the sport. Although one member of the reviewing team felt that "pinball games are either something that one likes intensely or dislikes intensely," and that computer pinball has even less appeal than real pinball to a non-fan, *David's Midnight Magic* seemed to hold a special fascination for players of all ages.



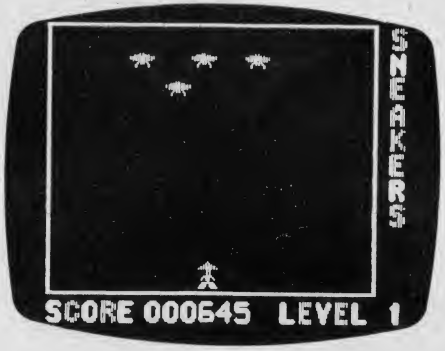
David's Midnight Magic.

Sneakers

Sneakers is another shoot 'em up game in which the player controls a "base" which moves across the bottom of the screen from left to right under control of the paddle. The paddle button is used to fire missiles into the air. However, instead of alien raiders or space ships, *Sneakers* offers an assortment of seven interesting, playful creatures which fly, bounce and attack the players. The first creatures are four "Sneakers" (half circles with little legs and sneakers on their feet). They bounce around the screen and occasionally drop down to the bottom where they attempt to trample the player base, and then jump back up to the top and bounce around there.

They are followed by flights of Cyclopses which come from left to right across the screen and drop lower on each pass. After he eliminates all the Cyclopses, the player is faced with missile-launching Saucers. These are followed by Fangs (little bird-like creatures which can turn into a bevy of Fangs which drop down to the bottom of the screen).

The next "creature" is an H-wing fighter which, by unanimous consent of our player panel, is the second most difficult to eliminate. Few players were able to eliminate all the H-wing fighters with just one base. These are followed by large and small meteors, then Scrambles (descending triangles which change direction when fired upon), and finally by "Scrubs" (diagonal, fast-flying missiles that all of our players agreed were the most difficult to eliminate).

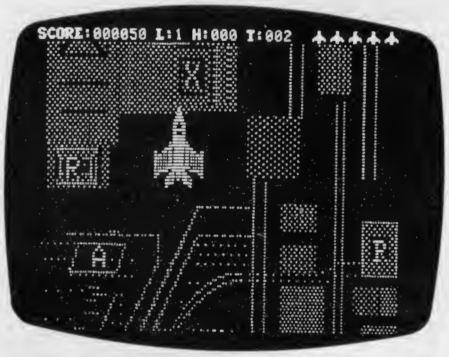


Sneakers.

Nevertheless, *Sneakers* was judged as a fun game even by players who scored in the 100 or 200 range.

Phantoms Five

Phantoms Five is a game in which the player is the pilot of a fighter bomber making continuous passes over a stretch of enemy terrain. The player drops bombs on enemy headquarters, fuel dumps, a post office, and other targets. In addition, he must avoid two targets, a Red Cross hospital and POW camps or risk losing all the points (or half) accumulated so far.



Phantoms Five.

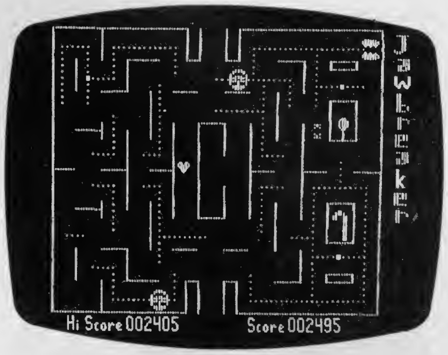
The only control is the paddle knob for steering from left to right and the button to drop a bomb. By pressing the space bar the player may change the view to a bomb site at the bottom of the aircraft. However, most players preferred not to use this option except to get some notion of how far ahead of a target the bomb must be dropped to hit it.

Interspersed between bomb runs are fighter attacks in which fighters fly at the player's plane head on. By turning the paddle knob a small amount, the player is able to aim his machine gun at them. After enduring a fighter attack, or being blasted out of the air as the case may be, the player goes on another bombing run.

All told, five planes are available to complete the "mission." The game goes by very quickly, but seemed to be one that most members of our playing panel enjoyed.

Jaw Breaker and Snack Attack

These are both PacMan-like games with the object of negotiating a creature (a fish in *Snack Attack* and a set of teeth in *Jaw Breaker)* around a maze eating up small dots, fruits, candies, and other goodies. The player creature is pursued by meanies which are released periodically from the center of the maze.

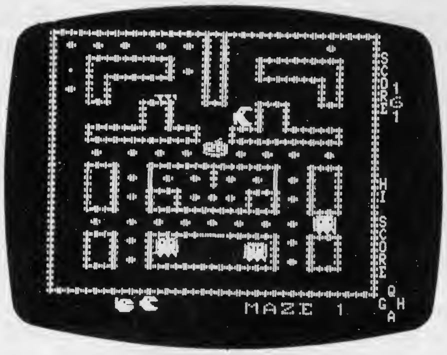


Jaw Breaker.

Both games have special colored dots located within the maze that, after being eaten, render the creatures chasing the player harmless at which time he can catch them and eat the meanies.

Upon clearing the entire board in *Jaw Breaker* the player is rewarded with a toothbrush that brushes the player's teeth and makes them "strong and clean" because in the next maze the predatory creatures are quicker and, after eating a colored dot, don't stay vulnerable for as long.

Upon clearing the maze in *Snack Attack*, the player is rewarded with a new kind of maze of which there are several.



Snack Attack.

Needless to say, the people who own the coin-op rights to PacMan are unhappy about this type of game and have taken legal action against some of the companies manufacturing them. However, the last time we checked both of these were still on the market and, for PacMan fans, either is recommended.

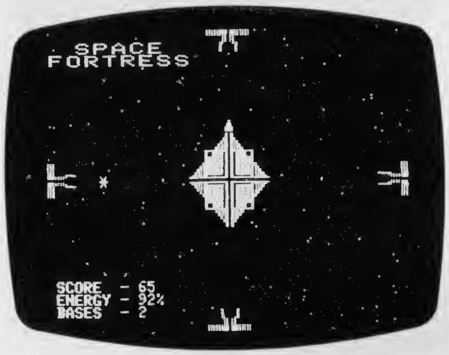
Clods, continued...

Escape from Arcturus

Escape from Arcturus is a two-part game, the first part of which is called "The Space Fortress." The fortress at the center of the screen is under attack from four bases of the enemy Griplems located immediately above and below and to the left and right. The player has a limited amount of energy with which to fire cannons at the approaching Photon torpedoes of the Griplems.

All firing is done by pressing one of four keys: G, Y, J, or Space Bar. If all of the Photon torpedoes are eliminated in one attack wave, a fighter circles the base and must be shot down. Eliminate the fighter and a command cruiser comes in with an erratic flight pattern. (We've seen this ship only once in hundreds of plays.)

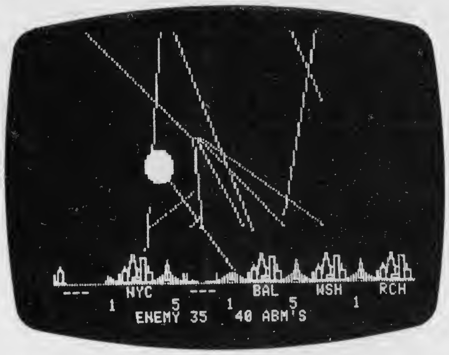
In the second game, "Escape," the player is a pilot controlling evacuation ships carrying people off a doomed planet. The ship is launched from the planet on the right side of the screen and, before it reaches escape velocity, six or seven Griplems attack with various types of ships. The paddle knob is used to steer the ship and paddle button to fire. After each successful launch of an evacuation ship into hyperspace, the player returns to pilot another ship.



Escape from Arcturus.

ABM and Missile Defense

These games are imitations of the popular arcade game Missile Command and have many of the same features. Incidentally, we consider these games for novices only when they are played with a joystick such as the Super Joystick from Peripherals Plus or JoyPort with an Atari Joystick from Sirius.



ABM.

In *ABM*, the mission is to protect six east coast cities from attack by ICBM missiles. At his disposal the player has much faster surface to air missiles that are launched from various launchers arrayed across the screen. With the joystick, crosshairs must be aimed slightly ahead of the track of an incoming missile and the button pressed to launch a SAM missile to intercept the incoming ICBM. A successful shot destroys the entire track of the incoming missile. After fifteen or twenty single ICBMs the enemy starts to get tricky with multiple warhead missiles that come about half way down the screen and split into six or eight additional missiles. Because of this, it is wise to try to get all incoming missiles as high as possible on the screen.

We found a good strategy for prolonged play is to protect the two cities at the right and left ends of the screen (Boston and Richmond) and their associated missile launchers. While points are awarded for every missile destroyed, this strategy involves letting missiles go through to hit cities that have already been destroyed. However, it is a good strategy for a prolonged game, since the game goes on as long as at least one city and missile launcher is intact.

We found this a most enjoyable game *when played with a joystick;* don't even think about playing it with paddles.

According to the instruction booklet, *Missile Defense* is playable with either keyboard or paddles. However, like *ABM*, we found it acceptable for novices only when it is played with a joystick. At the beginning of the game, selecting the P key (for paddle) option will allow the joystick to function "normally."

In this game, the player has six cities which he must defend with three missile bases located at the far right, far left, and center of the screen. Each base has a limited amount of ammunition which is fired by pressing the number keys, 1, 2, and 3. Sometimes, in the heat of the game, it is difficult to understand why repeated pressing of the number 1 key produces no shots. This, of course, is because there is no more ammunition in base number 1. Hence, it is desirable to fire from each of the three bases with more or less equal frequency.

In addition to the missiles, there are also bombs indicated by miniature plus signs. These are too smart to fall into the explosion made by one of the player missiles and can be shot down only by detonating a missile directly on top of them.

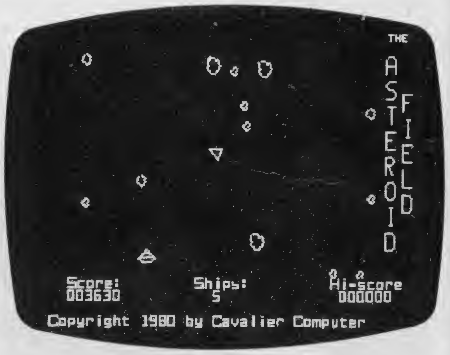
The game continues until all six cities are destroyed. However, the player receives one extra city for each 10,000 points scored.

If your tastes run to Missile Command, try one of these two games. Of the two, *ABM* is easier, but only slightly.

The Asteroid Field, Asteron and Apple-oids

From their names, it is not hard to guess that these are imitations of the Asteroids arcade game. In all three, the player has a ship which he can rotate using the paddle control (or keyboard controls for those with nimble fingers).

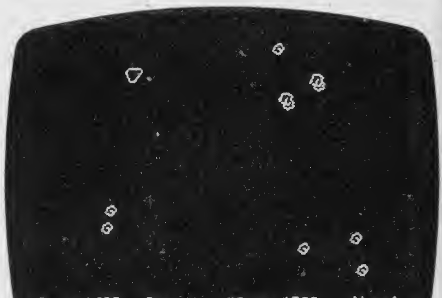
Asteroid Field has various options such as a demo mode (the easiest to play of all), keyboard mode, and several paddle modes. The reason for this is that some players like to control thrust with the paddle button while others like to control the firing of the weapon. We found it easiest to control weapon firing with the paddle button; in that case thrust is controlled with the button on the other paddle.



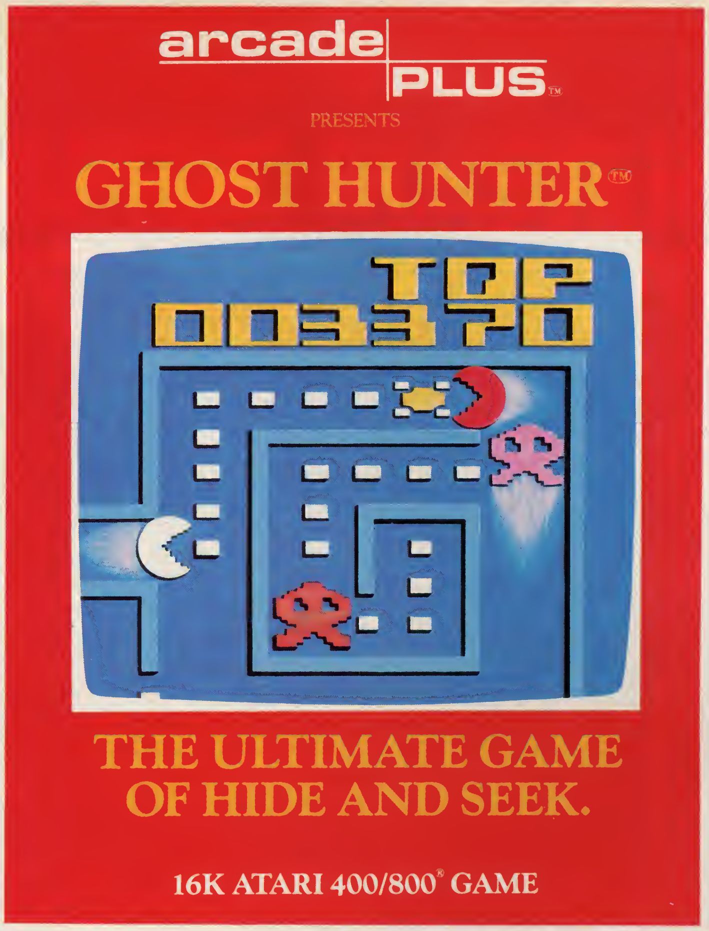
Asteroid Field.

Asteron is slightly different in that Paddle 0 always controls rotation with the paddle button controlling thrust, and shooting the gun is controlled with the space bar. This led to some awkward playing postures for our different players. The most popular method of play among the younger members of our playing panel was to have one player constantly firing the cannon with the space bar while the other controlled the rotation and thrust.

Asteron also has a hyperspace option. However, hyperspace was as likely to return the player ship to the field of asteroids in



Asteron.



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the path of an oncoming asteroid as not. Hence, hyperspace is a good strategy only when the asteroid field is relatively clear (and it is needed least).

In *Asteron* the player gets only three ships while in the *Asteroid Field* he has a choice of three or five.

A third version of Asteroids, *Apple-oids* sports apple-shaped asteroids floating about the screen. Each large apple-oid, when hit, splits into two smaller apple-oids and, when hit again, splits into even smaller ones. As in the other games, there are two different size saucers which periodically come onto the playing screen shooting at the player. These must be eliminated quickly or the player is destroyed.

In *Apple-oids*, the rotation of the ship is controlled by the paddle knob, thrust by the paddle button and firing by the asterisk key. As in *Asteron,* our players favored an approach with one player firing the laser cannon from the keyboard and the other controlling the rotation and thrust of the ship.

Apple-oids also has a hyper-space jump which is activated by pressing any other key on the keyboard. As in other versions of Asteroids, this is potentially dangerous because the player may move his ship directly into the path (or on top of) a fast-moving Apple-oid.

For those who like Asteroids, any of these three games is a good choice.

Torax

In this deceptively simple game, the player uses the paddle knob to control the height of a space ship flying at the left edge of the screen. The paddle button fires a particle beam cannon at invading Toroids which approach from the right portion of the screen.

In effect, the player is flying from left to right with the ground and starfield moving by to give that illusion. The player has two objects: first to shoot Toroids and second to prevent the Toroids from stealing the nuclear fuel tanks belonging to the player.

Each attack wave consists of 30 Toroids, each one of which is worth 20 points (or 30 points if it is carrying a fuel tank). Needless to say, the Toroids are also shooting back at the player, sometimes with single shots sometimes in volleys.

In addition to points for shooting Toroids, the player also gets 80 bonus points for each nuclear fuel tank remaining after an attack wave of 30 Toroids. The six high scores and player initials are stored on the disk. Altogether, a simple but highly addictive game.

Super Invader

The best imitation of the arcade invaders game, *Super Invader* still holds a special fascination for many players. In the game, rows of aliens line up across the top of the screen and march from side to side in unison. When the entire group has hit either the left or the right edge of the screen, they all drop one level lower and start moving in the opposite direction. Periodically, a space ship flies across at the very top of the screen and is worth extra points if hit.

Using a paddle knob, the player controls a missile base which moves from right to left at the bottom of the screen. It can be temporarily protected by ducking under one of three barriers at the bottom. However, these barriers get eaten away by both players' shots into them and by the writhing electric worms being constantly dropped by the aliens.

While everyone has his own favorite method of play for invaders, one that we've found good for prolonged games involves blasting away two or three complete columns of aliens near the center. This gives the player a place for a momentary rest as the aliens drop lower and as his barriers are eaten away. It also gives him a "window" through which to shoot the saucers passing over at the top of the screen. Second, one should move to one side of the screen or the other and try to blast away entire columns of aliens. By so doing, the entire group is prevented from reaching the wall and moving one level lower. Needless to say, these strategies are imperfect but they will probably prolong the game somewhat.

A nice touch in *Super Invader* is the group of three creatures at the right of the screen who placidly observe the progress of the game. However, when the player loses a base, the creatures flap their wings in merriment. This game has become a classic—and with good reason.

VIC-20

VIC Avenger

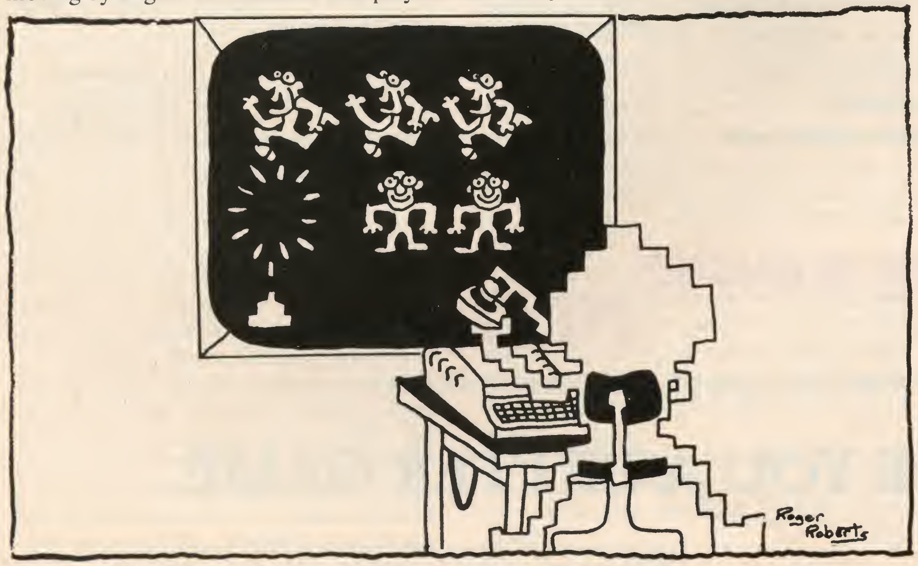
VIC Avenger is Space Invaders for the Commodore VIC-20. Like the original Invaders, it has advancing rows of alien creatures, extra saucers for extra points, barriers for protection and a laser cannon for defense.

The player moves the laser cannon back and forth with the L and ; keys (which are separated by one key on the VIC keyboard) and fires with the A. We found this arrangement slightly less satisfactory than the arrows and spacebar of the Big Five packages, since it is easy to let your fingers wander in the heat of battle, and having a key in between the right and left motion keys makes it more difficult to find the home keys. It is also easier simply to bang away on the space bar than to locate the A. Some players might prefer playing with the joystick, an option that can be selected at the start of the game.

The graphics on *VIC Avenger* are excellent—the aliens really look malevolent, and they change color as they approach the bottom of the screen. In addition to threatening the player with their bodies, they drop two types of bombs. Although there was nothing in the documentation to support this theory, it seems that some of the bombs can be stopped if hit by the player's shots.

When most of the creatures are eliminated, the few remaining ones speed up and skitter across the screen at an alarming rate. If they (or any of their relatives) reach the level on which the player is located, his cannon is destroyed.

That is the bad news: it is very difficult to get the last few aliens, and if the player fails, he loses. As the aliens march lower and lower, the player has very little time to waste. If his laser is hit, a new one appears on the far left side of the screen, and frequently, by the time he can get into position again, the game is over.



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Clods, continued...

If he does succeed in clearing the screen, a new flock of creatures appears and the game starts over.

Slot Machine

This game is for real clods. *Anyone* can play *Slot Machine* for the VIC; the hardest part of the game is plugging in the cartridge.

As confirmed non-gamblers (we played $2 in nickels in the slots on our last trip to Las Vegas), we have a hard time getting excited about a slot machine program. But we know that there are people who enjoy gambling, and who are particularly fond of slot machines.

Again, the graphics on the VIC are outstanding—just as good as the ones on the computerized slot machines in Atlantic City and Las Vegas. There are lemons, cherries, apples, eggplants(?), bars, bells and "Commodore 7s." There is also a little person who pulls the handle.

When the program is loaded, a message under the slot machine says, "I am ready to accept coins." By pressing the C key, the player can deposit one, two, three, four or five coins of unspecified denomination. As with real slot machines, the larger the number of coins deposited, the greater the number of possible winning combinations.

Pressing P causes the little person in the corner to pull the handle, and the wheels begin to spin. From then on, the action is exactly like that of a real slot machine, except that when the player wins there is no clatter of quarters to be collected. The VIC simply displays a message announcing the number of coins won, and that number is added to the player's total. If nothing is won, the machine says, "I am ready to accept coins," and the cycle begins again. ☐

Dave Howell

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Deadline from Infocom

Realism Comes to Adventure Games

Betsy Staples

creative computing
SOFTWARE PROFILE

Name: Deadline
Type: Detective/adventure game
System: Apple II, Atari 800, IBM PC, NEC PC-8000, CP/M
Format: Disk
Language: Interlogic Machine Language
Summary: Excellent
Price: $49.95; CP/M $59.95
Manufacturer:
Infocom
55 Wheeler St.
Cambridge, MA 02128

An overdose of pills, a nosey housekeeper, a wayward son, and a failing business are but a few of the elements to be considered in the investigation of the death of Mr. Marshall Robner.

Mr. Robner has been found dead in the locked library of his suburban Connecticut home — the apparent victim of an overdose of Ebullion. His attorney feels that although the evidence points to suicide, the circumstances are suspicious enough and the size of the estate large enough to warrant a police investigation. You have been assigned to investigate.

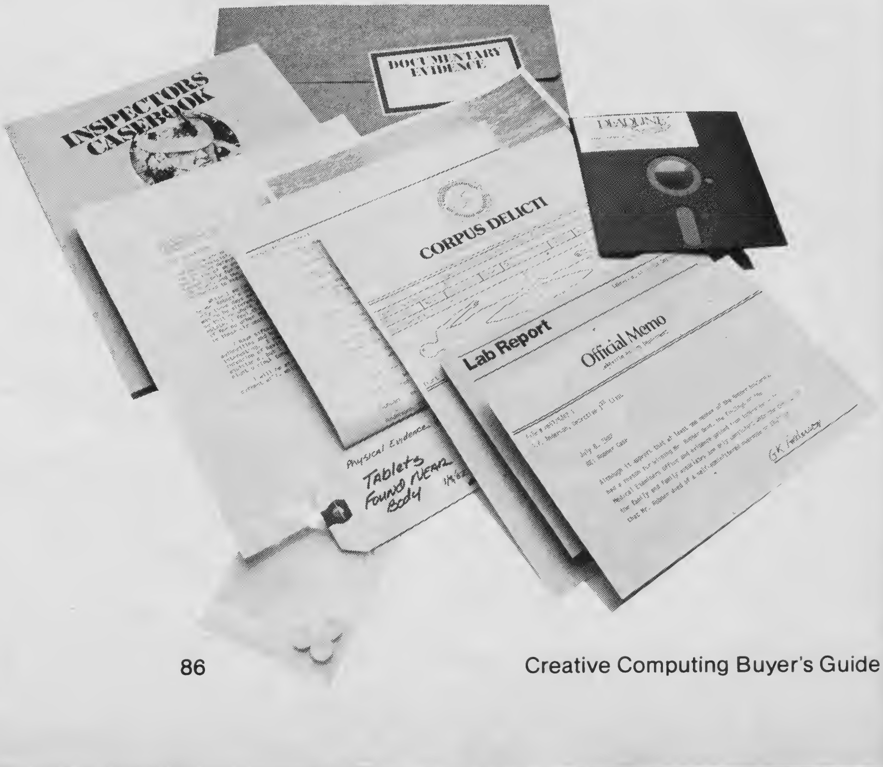
Thus the stage is set for the game of *Deadline* from Infocom, makers of *Zork* and *Zork II.*

Deadline is a cross between an adventure game and a mystery novel — with an important difference. In this game, the player is a participant and can influence the outcome of each round of play.

The packaging and documentation are very impressive and imaginative. The disk comes in a reddish brown file folder/envelope along with all the evidence needed to begin the game. Included are a letter from Mr. Robner's attorney, a memo from the police, lab and coroner's reports, a photograph of the scene, transcripts of interviews with the Mr. Robner's family and associates, a small plastic bag containing the pills found at the scene, and the Inspector's Casebook.

The Casebook is a cleverly written instruction manual which lists the ground rules and describes some of the more useful commands.

When the game begins, it is 8:00 a.m. and you are standing outside the Robner



home. As in all adventure-type games, you can move about by typing the direction in which you wish to go. If you choose to enter the house, you are met by Mrs. Robner who tells you somewhat grudgingly that you may wander about the house and grounds, but you must be out by 8:00 p.m.

As you walk through the house, you meet Mr. Robner's family and associates, and may engage them in conversation at any time. The program is not equipped to handle specific questions such as "Where were you last night?" but characters respond very nicely to indirect query such as "Tell me about Mr. Baxter."

During the time you are in the house, things are in a constant state of flux — just as they would be in a real house. People move from one room to another, the phone rings, mail is delivered, the servants perform their duties, etc. If you respond in the proper way to each situation, you will accumulate sufficient evidence to crack the case. If you fail, for example, to follow someone who is on an evil errand, you may miss a crucial fact.

This can be frustrating to one who is used to the more traditional adventures in which things remain fairly static throughout the game, because it means that you are unlikely to solve the crime on the first try, even if you save the game as you go along. On the other hand, it is much less frustrating than having to worry whether pushing the yellow button or unlocking the rusty gate will unleash some lethal force. There are no arbitrary or irrational dangers in *Deadline*.

The first time you come to a location, you are presented with a very detailed description — sometimes more than a full screen of text — and a list of the people (if any) present and what they are doing.

You are unlikely to solve the crime on the first try.

On subsequent visits to that location, you see only an abbreviated description such as "library," "master bedroom" or "east lawn," and a list of the people present and what they are doing. A request to LOOK recalls the complete description, but costs another minute of your precious investigation time.

A very nice feature is the ability to create a "transcript" of your investigation on a printer. This saves time by allowing you to check a description or establish a sequence of events. The SCRIPT command can be given at any point in the game, as can the command to stop printing.

Deadline does not limit the player to one- or two-word commands. It understands full sentences, and even allows you to manipulate more than one object at a time: "Take the teacup and the pencil."

I had great difficulty with fingerprints. I tried all the ways I could imagine to check for fingerprints on important objects, and failed miserably. When I related the experience to Marc Blank, author of the program, he promised to add a few more ways to collect fingerprints to the final version of the game.

Aside from the frustration of not being able to check for fingerprints, I found *Deadline* to be a thoroughly engrossing and realistic game. I like the idea of depending on my own wits and analytical abilities to solve a problem. I like the fact that there is more than one way to get bits of information. And I enjoy the presence of other people — as opposed to dwarves, sorcerers and unicorns — in the game.

Marc Blank has done a superb job programming a complex game, which I hope will be the first of a sub-genre of "real-life" adventure games. ☐

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The Monster Mash

Larry Kerns

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SOFTWARE PROFILE

Name: Crush, Crumble and Chomp

Type: Fantasy

System: 16K TRS-80, 48K Apple with Applesoft

Format: Disk or Tape (Disk only for Apple)

Language: Basic

Summary: A classic.

Price: $29.95

Manufacturer:
Automated Simulations, Inc.
Dept. 103, P.O. Box 4247
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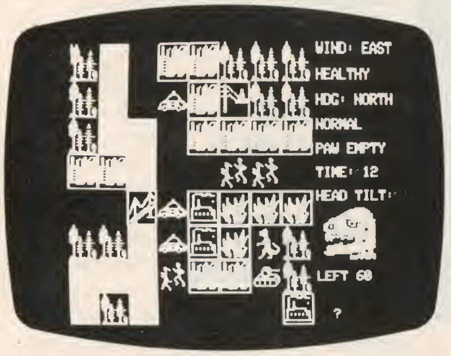
Mountain View, CA 94040



Larry Kerns, 10756 Keswick, Sun Valley, CA 91352.

Have you ever wanted to crush a building or see a giant bridge crumble? Have you ever dreamed of chomping on one of your enemies?

If so, I've got a game for you! It's called *Crush, Crumble and Chomp*! (Automated Simulations). For just $29.95 you can spend many enjoyable hours being your favorite movie monster while the computer contents itself with the role of the poor humans.

Goshilla is a Godzilla look-a-like that leaves a trail of corrosive radioactive waste wherever he goes.

This game is available for the TRS-80 or Apple in either tape (16K) or disk (32K). The Apple version gives you the more delightful graphics, and the disk versions allow you to custom-design your very own monster. Otherwise, you have six monsters from which to choose.

There is Kraken, a giant squid type that loves to crush buildings. He can also paralyze and atomize with his destructive ray. There is Mantra, the flying pre-historic monster. He has an ultrasonic scream that will knock your ears off, and can breathe fire as he flies.

The glob is also present. He is unique in that he doesn't have a front to worry about (makes for fast turning). He can descend and move subsurface (makes him awfully hungry though), and he leaves a slime trail that bursts into flames when exposed to the air.

Goshilla is a Godzilla look-a-like that leaves a trail of corrosive radioactive waste wherever he goes. He can swim, descend and move subsurface, atomize, and even zap pesky helicopters with his ray beam—generally, a good all around monster.

Arachins is a giant spider that can paralyze nearby units, weave a web to stop traffic and breathe fire. Mechismo is a powerful character in that he never tires or gets hungry (a major weakness of all the other monsters). Mechismo is a giant robot and can stomp, crumble, atomize, zap or breathe fire.

The monsters never win; they will last about 30 minutes with a little care, however. It is only a matter of time before the humans (especially the Mad Scientist) get them, but you accumulate points along the way depending on what objectives you choose.

You could pick "Balanced" and get points for nearly everything you do. "Killer monster" means that you want to kill humans (eat them, you'll live longer). "Combat machine" gets you points for killing human combat units. "Destruction" means that you like to see buildings fall, while "Survival" is the most noncombative choice.

You have four cities from which to choose. The screen can only display a few blocks at a time, but a complete map of all accessible areas is provided. I never used the maps myself; it just didn't seem right that a monster from the deep should be able to follow a map around New York City, San Francisco, Washington D.C., or Tokyo.

All cities have plentiful water areas, dreaded power plants, and other points of attraction. I enjoyed smashing the IRS building in Washington, D.C. but you might prefer tearing down the Golden Gate Bridge better.

The sound routines provided are a bit tiring, but they can be bypassed. You can select either a fast or slow speed of play. I also had trouble with one of my monsters. It has a bug in it which causes the program to lock up after just two or three moves. The TRS-80 version also needs a shape table to help figure out what the various shapes are supposed to represent.

A typical game might go as follows: Goshilla suddenly appears in Tokyo near the Ara River. He can see but a few blocks in front of him, but all is quiet. He swims along the river over to the downtown area where all the big buildings look attractive. He sees a few humans running around, but he is not hungry yet so he doesn't get too excited. He crosses the Simuda River and stands near the Ginza.

It's time to let them know who just arrived in town so he crumbles the building.

I enjoyed smashing the IRS building.

Gee, that was easy. He goes down to Tokyo Tower where he finds three human mobs. He chases one over a block before he grabs it. He eats it. Yum, yum! It feels like a pin prick. But since several hundred pin pricks will kill him, he grabs it and eats it.

Goshilla then heads up toward the Imperial Palace. It would be neat to crush that, but a tank and an artillery piece suddenly appear and block his way. They fire and hit him. Goshilla goes from "healthy" to "scratched," and he is getting hungry besides.

There are two helicopters buzzing around and they are giving him a headache. He moves into the same space as the tank and stomps on it. Go 'em. He then zaps one of the helicopters and tries to atomize the artillery. Instead, he turns two buildings into ruins. By now, he has stood in one place too long and has attracted a crowd, so he burrows underground and moves five blocks west.

When he reappears, he is so hungry he goes berserk. He grabs a tank and eats it. Not much meat, but it is filling. Goshilla then runs rampant for a while, occasionally listening to reason, but not often.

When he finally regains control, he is still hungry and is now hurt.

All at once, the Mad Scientist appears. Run, Goshilla. Run! "Oh, he got me." He is not bleeding, but he feels very chilled and everything is going black. Humanity has triumphed again—630 points.

Overall, this is an excellent program. It is well worth the money and involves the player thoroughly. It is like a computerized "The Creature That Ate Sheboygan." If you liked that game, here is a ready opponent. You're the monster. It's a classic. □

Kelly's Computing

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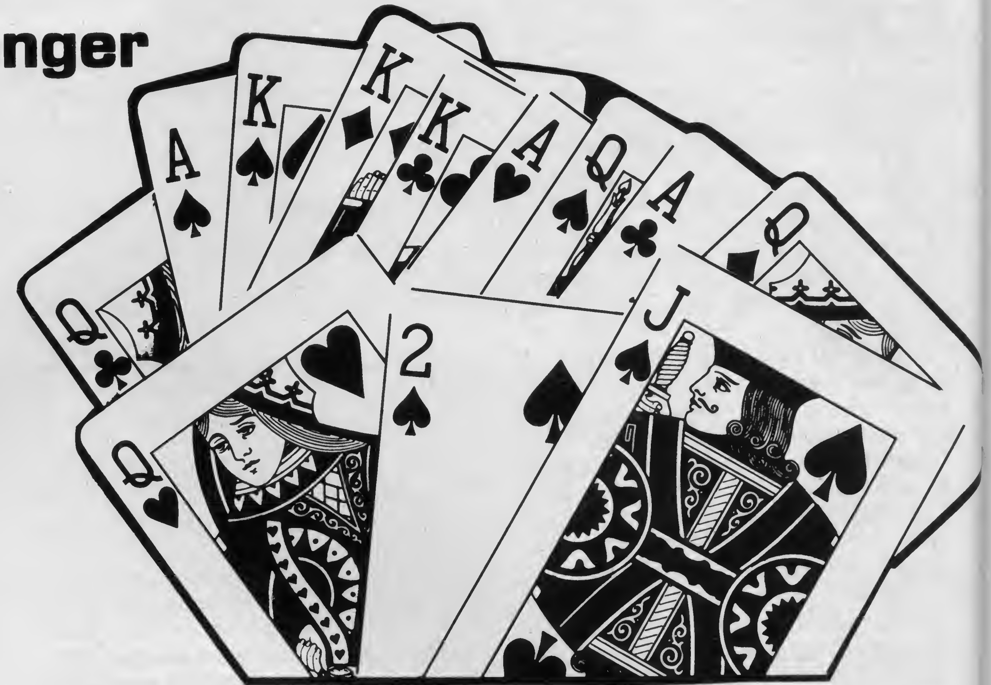
An Old Challenger Bridges New Waters



Owen Linderholm

creative computing
SOFTWARE PROFILE

Name: Bridge 2.0

Type: Bridge-playing game

System: 8K Apple, Atari, Pet, TRS-80, CPM and Disk Drive or cassette

Format: Disk/Cassette

Language: Basic

Summary: Reasonable bridge-playing program

Price: $15.95 for cassette, $19.95 for diskette

Manufacturer:
Dynacomp, Inc.
1427 Monroe Avenue
Rochester, NY 14618

In the December issue of the magazine we carried a review of the "only" two bridge playing programs or machines on the market. One other program that has been available for a year or so was inadvertently left out of the review, so it is presented here. The program is *Bridge 2.0* from Dynacomp; it costs $15.95 on cassette and $19.95 on diskette and is available for almost all the popular microcomputers, including Apple II, Atari, TRS-80, Commodore Pet and CP/M systems. The program itself is of a standard in between that of the two Bridge Challengers mentioned in the earlier article. It bids and plays three of the four hands, thus allowing only one human player.

This program is not a Master player, nor is it especially fast and it will never replace the company of even one other human player, but it could be useful when you are alone and feel like practicing a few hands. The program should also prove useful in training beginning players since it will probably not lose its temper or scream about incompetent, idiotic partners.

The program is written in Basic which means that the impatient card player will have to learn a little patience. In the actual play of the hand the delays are hardly noticeable, but during dealing and sorting the computer can hold up play for as long as twenty seconds. Bidding is somewhat limited since the computer only understands very basic bids. It takes an opening of a suit at the one level as showing 13+ HCP and a strong suit, an opening of two of a suit as 22+ HCP and a strong suit, a 1NT opening as a balanced hand with 16-18 points. Responses are totally natural and mean exactly what one would expect. No conventions are used at all, so the partners have little information about one another's hands, although they usually end up in the correct contract.

The program plays quite well, especially when it is defending against your contract. It plays less well when it has to defend against a contract. One of the best features of the program is the way it keeps track of the cards and deduces where voids are and who has the high cards in a certain suit. This means that it almost always knows when to pull trumps, ruff tricks and lead to its partner. Nevertheless the program only knows very straightforward tactics during play and cannot finesse or understand conventional leads. I also noticed it leading away from an ace on a few occasions. The program does seem to know how to make a squeeze, but only by using trumps and does so only on occasion.

The program has several disadvantages not directly related to the way it plays bridge. You cannot set up hands to play yourself, so experimentation with interesting hands is practically impossible. It is possible to repeat a hand or a certain series of hands, but the method used to achieve this is very clumsy. There are no graphics in the program, only text. This makes the program less convenient than it could be. One unusual feature of the program is that when you end up as dummy, you play your partner's hand, which lets you practice a bit more than you otherwise might.

```
             BRIDGE 2.0

      (C) 1981 BY DYNACOMP,INC.


ENTER ANY POSITIVE NUMBER:12
SHUFFLING
DEALING
SORTING



YOUR HAND (SOUTH):
   S: K6
   H: T865
   D: AQJ32
   C: J8

YOU ARE THE DEALER,
WHAT DO YOU BID?

SOUTH?1D
 WEST: 2C
NORTH: PASS
 EAST: 2H
SOUTH?PASS
 WEST: 3C
NORTH: PASS
 EAST: 3H
SOUTH?PASS
 WEST: 4H
NORTH: PASS
 EAST: PASS
SOUTH?PASS


THE CONTRACT IS: 4H
THE DECLARER IS:  EAST


REVIEW OF THE BIDDING:

SOUTH  WEST   NORTH  EAST
1D     2C     PASS   2H
PASS   3C     PASS   3H
PASS   4H     PASS   PASS
PASS


READY TO PLAY?YES


    ROUND:1
    ********
    4H     WE:0   THEY:0
              SOUTH:
                  S: K6
                  H: T865
                  D: AQJ32
                  C: J8
    SOUTH PLAYS ?KS
     WEST PLAYS: 5S
    NORTH PLAYS: 2S
     EAST PLAYS: AS

    ROUND:2
    ********
    4H     WE:0   THEY:1
     WEST:
        S: QJT
        H: 73
        D: 7
        C: AKT632
              SOUTH:
                  S: 6
                  H: T865
                  D: AQJ32
                  C: J8
     EAST PLAYS: 3S
    SOUTH PLAYS ?6S
     WEST PLAYS: TS
    NORTH PLAYS: 4S
```

```
    ROUND:8
    ********
    4H     WE:1   THEY:6
     WEST:
        S: QJ
        H:
        D: 7
        C: AKT
              SOUTH:
                  S:
                  H:
                  D: AQJ32
                  C: J
    SOUTH PLAYS ?ADS
    ERROR IN LEAD, TRY AGAIN.
    SOUTH PLAYS ?AD
     WEST PLAYS: 7D
    NORTH PLAYS: 9D
     EAST PLAYS: 4D

    ROUND:9
    ********
    4H     WE:2   THEY:6
     WEST:
        S: QJ
        H:
        D:
        C: AKT
              SOUTH:
                  S:
                  H:
                  D: QJ32
                  C: J
    SOUTH PLAYS ?2D
     WEST PLAYS: TC
    NORTH PLAYS: KD
     EAST PLAYS: 5D
```

This shows you exactly how the computer plays a certain hand. In the listing is given an example of the way the computer deals and handles the bidding. A few of the rounds played are shown as well. As you can see the final contract was 4H by East which is too high since in another run of this hand I managed to set the contract by three tricks by leading the ace of diamonds followed by a low diamond which is ruffed in dummy. We were then allowed to take two spade tricks, one heart trick and two more diamond tricks. In this example I led the king of spades which was a very poor lead since it lost us the two spade tricks. Later my partner, the computer, lost us one of the diamond tricks by holding on to the king of diamonds and playing it when he had no way of getting back into my hand for the other diamond trick. This happened in rounds eight and nine shown in the listing. My computer partner, North, should have played the king on the ace, leaving me with two more diamond tricks. These mistakes meant that the computer made the contract which could have been set by at least two tricks.

As you can see, the computer plays less well when trying to stop a contract but it does play an adequate game and one that beginners will find challenging. A person who takes bridge seriously would probably have little to gain from the program, but it represents a reasonable value to the casual player or to the beginner. ☐

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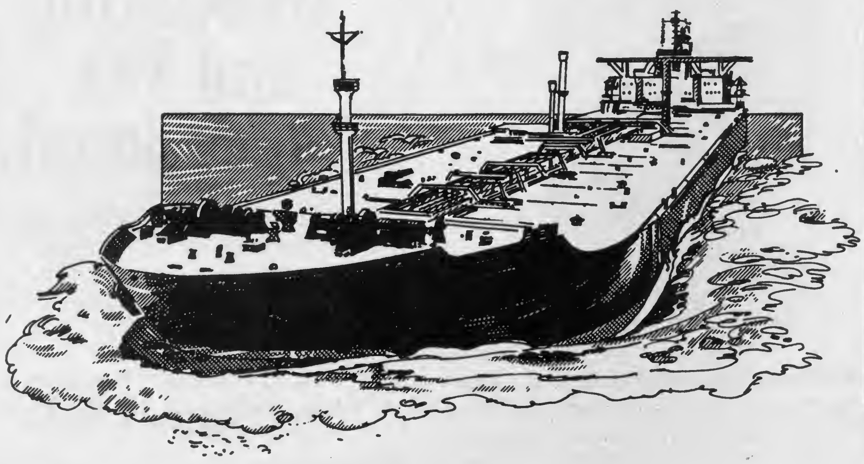
CIRCLE 147 ON READER SERVICE CARD

Valdez: A Supertanker Simulation

Mike Kohlrust



creative computing
SOFTWARE PROFILE

Name: Valdez
Type: Supertanker
System: 16K Apple, PET, Northstar, TRS-80, CP/M, 24K Atari
Format: Disk and Cassette
Language: Basic
Summary: Excellent
Price: $15.95 cassette; $19.95 disk
Manufacturer:
Dynacomp, Inc.
1427 Monroe Avenue
Rochester, NY 14618

To me, a simulation is valuable, in direct proportion to its ability to mirror the world. In a wider sense, games, such as the fantasies that are widely available, are also simulations, but their primary purpose is as games. I feel that the main purpose of a simulation is to tell or teach me something about the real world. If there is fun to be had in the process, so much the better. Valdez succeeds on both accounts.

The object of Valdez is to navigate a supertanker from the North Pacific approximately 100 km. into the port of Valdez, Alaska. All of the important characteristics of a 300,000 ton supertanker have been accurately programmed into the simulation. In addition, a 64,000 point bit map is included.

All navigation must be done in relation to this map. This sounds easy. After all, all you have to do is tell the tanker when to turn and when to stop, right? Wrong! When I said that all of the characteristics of the tanker had been simulated I meant just that. Turning an object which weighs over 300,000 tons isn't done on a dime; neither is stopping or accelerating it. Momentum is one of the most important factors to be considered in the operation of this type of ship.

Once you have learned to control the ship through helm and engine commands, you must guide it through narrow passes into Valdez harbor. Once again this isn't as easy as it sounds for the computer is sailing other ships downstream from Valdez into the North Pacific. If you manage to dodge all of these ships, and there can be up to a dozen on the screen at any given time, you must then dodge the icebergs generated by the Columbia Glacier.

As if this isn't enough, you must take into account the tides in the area, which are quite strong and varied, and can have strange effects on your course.

Once you have made it into Valdez you must dock with the floating unloading station by bringing the ship to a dead stop with an accuracy of a few meters. As I said, it isn't as easy as it sounds!

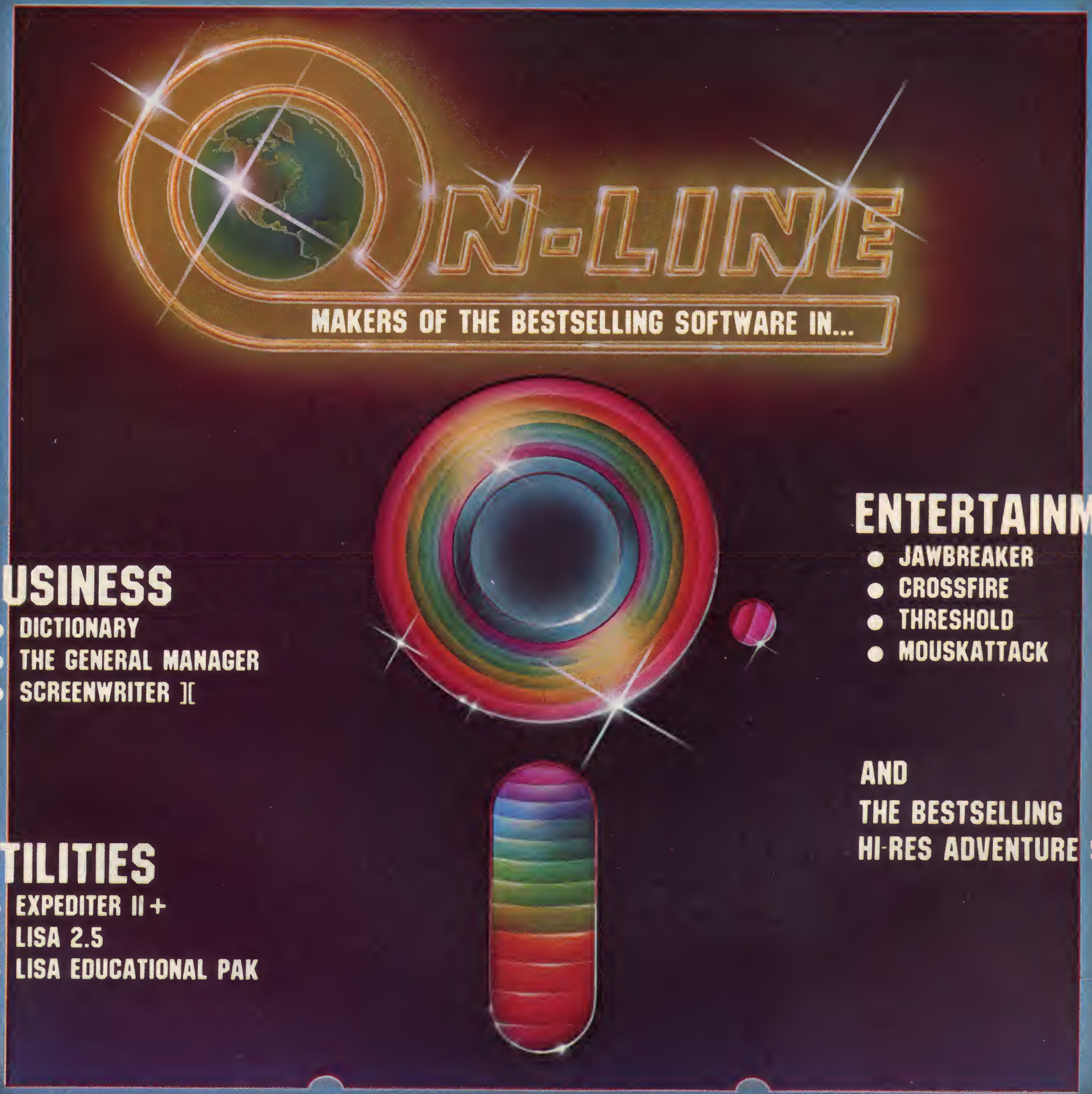
The feel of the simulation is one of accuracy and authenticity. Never having piloted a real supertanker, I can't swear to that, but shortly before purchasing this simulation I read "Supership!" by Noel Mosterat, and the problems he discusses in the book all show up in the simulation—including the unreliable power plants!

It is obvious that someone has put a great deal of time and effort into Valdez and that it has paid off. On the whole, the results of interacting with this simulation have been an increased appreciation of the difficulties involved in operating this type of ship and several burned dinners as I have put off turning the hamburgers while trying "just one more round."

All of this isn't to say that the simulation is perfect. After all, no program is. There are several minor problems. The first is that the "play value" of the simulation has been somewhat neglected. For instance, there is no scenario at the beginning to set the scene. In addition the Apple II version that I have makes no use of the strong points of the Apple such as its sound and graphic capabilities. This is common with programs that have been developed for one system and translated into others. Apparently Valdez was developed on a Northstar system and translated to most others.

However, one of the nicest things about this program is that it can easily be modified to achieve the exact feel you want. Moving the opening down a few lines leaves room for a nice scenario and sound is easily added, even by a novice Applesoft programmer like me. Modifying the For/Next loops in lines 149 and 157, for example, can produce any radar effect that you want. My program has been modified to include both sound and variable radar scans, which make the simulation much more enjoyable for me. The only problem is that the wider scans take quite a while to display. I'm surprised that a short machine language program hasn't been incorporated here to speed up the display generation.

All in all Valdez is an excellent simulation and one of the few in this class that is available for all popular computers and on cassette. The best thing I can say about it is that it is exactly what I expected to be able to do when I bought my Apple a few months ago. I hope to see more such programs in the future—especially in cassette form. ☐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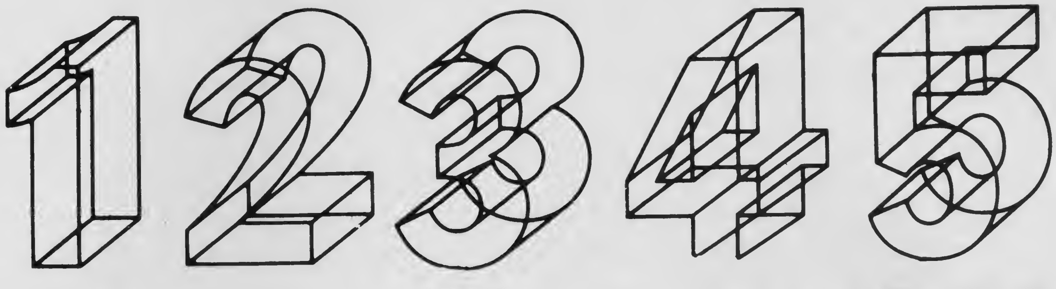

Five for the Vic20

David Lubar

In many cases, the first release of software for a new computer is of the "so what?" variety; there are hangmen aplenty, unlimited variations of nim, and rehashes of teletype-oriented games from ages ago. Let us pause and praise Commodore for knowing better. The first batch of VIC software is here, and it looks pretty good. They supplied us with four games and one personal utility. The games range from fair to very good, and the personal utility is useful if you need a quick graph of your biorhythms. Only two of the programs bear any hint of the early-release syndrome.

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Modeled after a popular arcade game, *Car Chase* was the best game of the lot. The player moves through a course of concentric rectangles, attempting to drive over a series of dots while avoiding head-on collisions with a computer-controlled vehicle. There is an opening on each side of each rectangle, allowing the player's car (and the chase car) to change lanes. The chase car is endowed with unerring accuracy, and capitalizes on any mistake the player makes. Balancing this, the player has three chances per game. Four keys are used to control the car; "A" accelerates, "D" decelerates, "J" is used for moving inward, and "K" is used for moving outward. This arrangement works well once one gets used to it.

If the player succeeds in clearing the screen of dots, he gets a new screen. This process continues until the third collision. At this point, the program displays the most recent score, and the highest score achieved by the player. A press of the space bar starts the game again. *Car Chase* is fun, challenging, and a good omen for the future of the VIC.

For Goodness Snake

Slither and *Super Slither* are two games on another VIC cassette. *Slither* puts the player in control of a snake with an appetite for numbered squares. The player guides the snake around the screen, using the "I," "J," "K," and "M" keys to move up, left, right, and down. The game lasts for sixty seconds. During this time, boxes appear at random locations on the screen. The object is for the snake to collide with the box, while avoiding any collision with the wall or his own body. Each box contains a number, from one to nine, representing a point value. Every time the snake scores points, it grows an extra segment, increasing the danger that the head will hit the body. Only one box appears on the screen at a time, and the boxes only last for a certain amount of time before disappearing.

Super Slither expands on the above game in two ways. First, up to three boxes can be on the screen at any one time. Second, instead of gaining one segment for every box, the snake gains a segment for every point. When the player's score reaches the forties or fifties, maneuvering can become a bit tricky. The only disadvantage with this package is that the two games must be loaded separately. It would be nice if they had been combined, allowing the user to switch between games without stopping to load a program. Aside from this, the games are quite good, and will appeal especially to the younger members of the VIC community.

Busted Again

While *Casino-Style Blackjack* is a vestige of the early days of computer software, this VIC version is well done, incorporating all the features of the game except for insurance bets. Designed for one or two players, with the VIC as the house, the game is a good buy for the casino lover who lives far from Atlantic City or Las Vegas.

Octopus Wanted

Blue Meanies from Outer Space was the one weak game of the group. The player uses six lasers, controlled by six keys, to shoot at the Blue Meanies as they drop from the sky. If a Meanie hits the ground, he destroys a small square area. If enough of the ground is destroyed, the base is overrun and the player loses. The ground can be repaired using a robot which is controlled with five more keys. This combination leaves one in danger of permanently interlaced fingers.

If the player survives the first twenty Meanies, the attack begins anew with meaner Meanies. The player is given a certain amount of energy. When this runs out, he can't shoot. Since the VIC, like the PET, seems to buffer keyboard input, a keypress while power is down can result in a shot from the laser when power is restored. This usually happens after the Meanie has moved past the laser, and can be a touch frustrating. While there is nothing really bad about the game (our summer campers loved it), Blue Meanies just doesn't compare well to the other releases.

In the Mood

Biorhythm Compatibility draws a graph of a person's physical, emotional, and intellectual cycles, displays critical days, and can predict the compatibility of any two people whose birthdates are entered. As with blackjack, the biorhythm program is old stuff though well executed. While opinions vary as to the validity of biorhythms, the program is ideal for parties and other gatherings of humans in need of something to do.

Summing It Up

The early VIC line was obviously not rushed to market. The games are filled with error traps that won't allow bad input. The first improvement Commodore should make is better documentation. Each game is accompanied with a single sheet which, though it explains the game, is more a summary than full instructions, leaving the user to discover the fine points through trial and error. Beyond this, the first release of VIC software is nothing but good news for VIC owners. The tapes are available for a suggested retail price of $14.95 each. The five reviewed above, along with another program, are also available in a six pack retailing for $59.95.

The Future

A discussion with Commodore revealed ambitious plans for further software releases. The next six pack of tapes will include programs for personal finance, home inventory, and line-oriented word processing. For recreation, there will five cartridges with Scott Adams Adventures, and one with the popular *Sargon* chess program. In the arcade area, releases will include *Vic Avenger*, *Super Lander*, and *Super Alien*. Planned utilities include *VIC-MON* with machine language aids and *Programmer's Aid* for Basic. Finally, to gladden the heart of old Trekkies, Commodore has selected William Shatner to be their commercial spokesman for the VIC.

Commodore Business Machines, Inc. is located at 950 Rittenhouse Rd., Norristown, Pa. 19403. ☐

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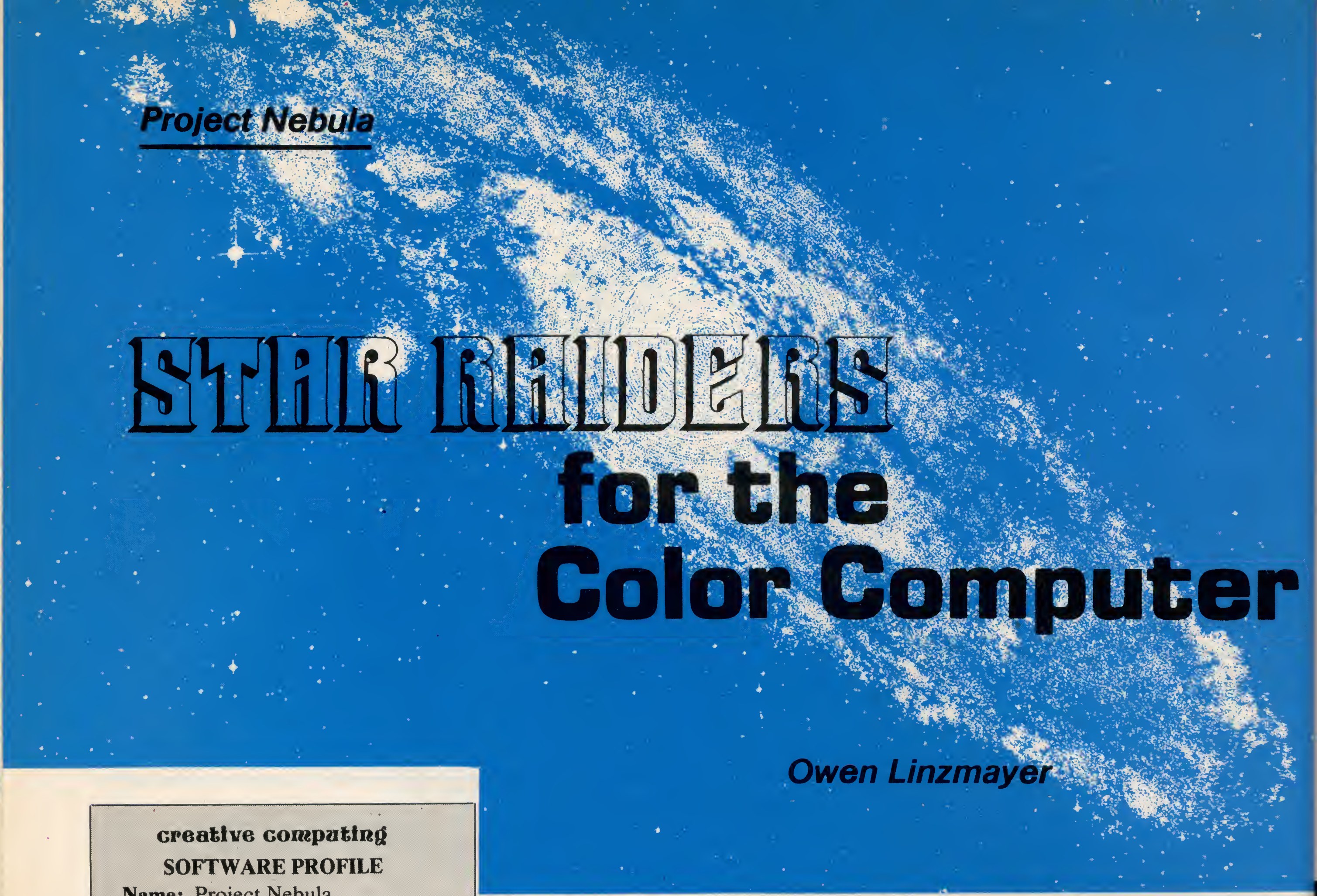


Project Nebula

STAR RAIDERS for the Color Computer

Owen Linzmayer

creative computing

SOFTWARE PROFILE

Name: Project Nebula

Type: Strategy/Arcade game

System: TRS-80 Color Computer, joysticks, 4K RAM

Format: Program Rom-Pak

Language: Machine

Summary: Fair Color Computer version of Star Raiders

Price: $39.95 catalog # 26-3063

Manufacturer:
Radio Shack
1300 One Tandy Center
Fort Worth, TX 76102

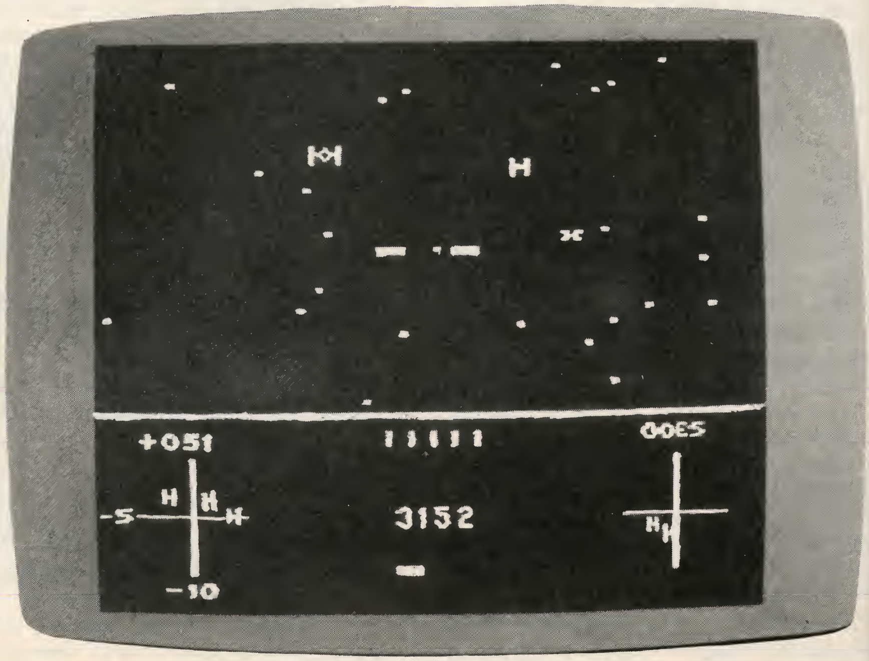
Project Nebula is a Color Computer version of Atari Star Raiders, a game in which the player controls a lone fighter in space, searching and destroying alien ships in real time.

The object of the game is to defend earth from the evil forces of Zykon. If you are successful in your mission to rid the galaxy of enemy ships, planet Earth is saved. If not, Earth is doomed to become a slave-planet of Lord Scylla.

After inserting the Rom-Pak, you choose among the four game modes. These are Target Shoot, Target Shoot with speed, Star Commander and Advanced Star Commander.

The first two modes are exactly what their names imply: target shoots. They are helpful for practice, to become familiar with your ship's controls and how the enemy fighters act.

Star Commander mode offers a complex mission in which you are aided with a long-range sensor and hyperspace engines to propel your ship into other sectors. The long-range sensor displays the 45 sectors of your galaxy in a lo-res 9 x 5 matrix.



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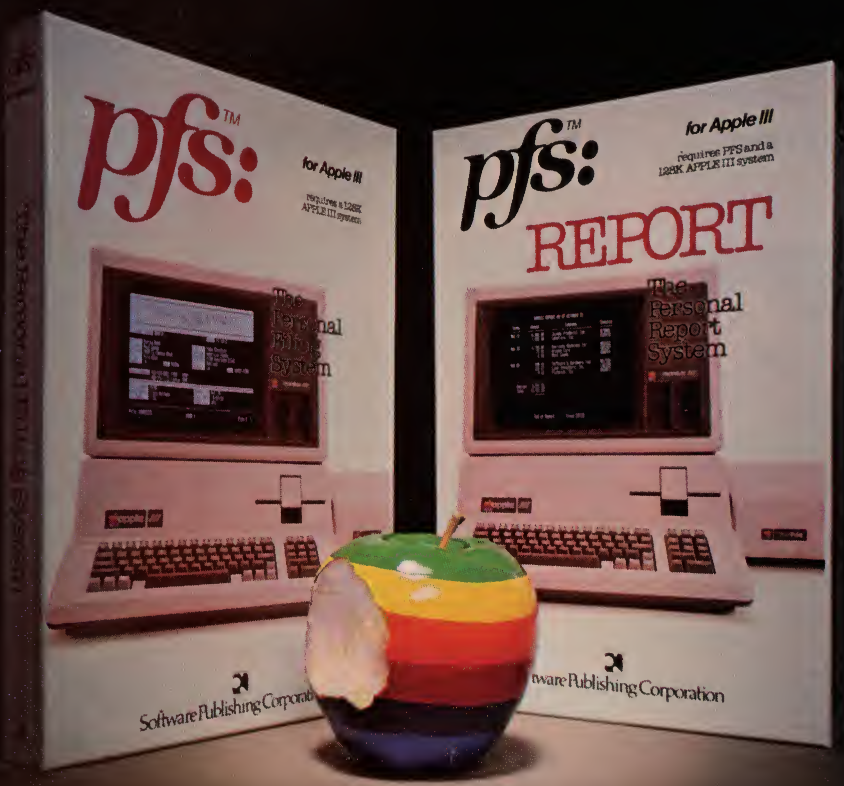
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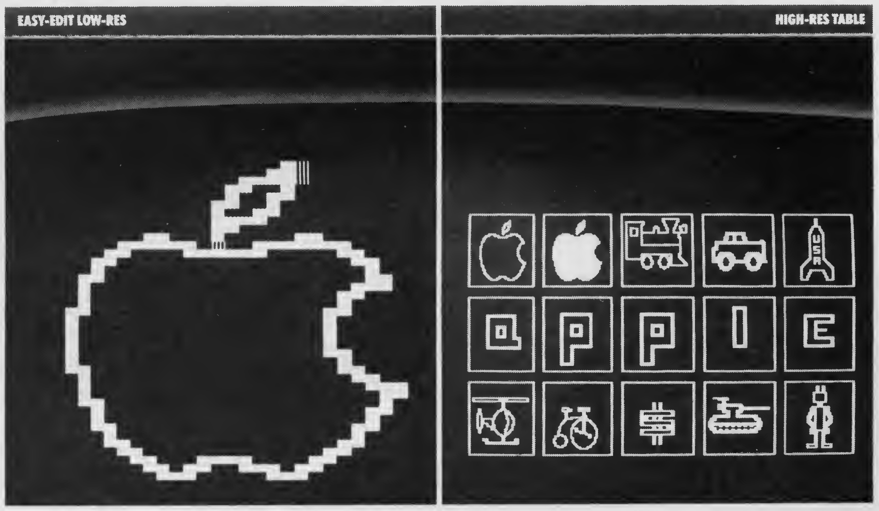

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Project Nebula, continued...

Each sector may contain either a friendly space station, used for refueling and repairing damage, or up to four enemy ships. The only difference between the two Star Commander modes is that in the Advanced one your ship may be damaged. There are ten difficulty levels for each game mode.

The game screen is divided into two displays. The upper portion is a hi-res yellow-on-red graphics display of a cockpit view. It is through this window that you see the stars drift by and enemy fighters swoop in for the kill.

The lower third of the screen is your instrument panel. Located on this control console are two short-range sensors; one frontal, the other rear. These two grids help in determining the location of other objects in the sector relative to your ship. Your fuel gauge is located between the two sensors. Being shot, entering hyperspace and firing your lasers all use up fuel and when the gas is gone, you lose. Directly above the fuel gauge is some sort of scanning device which does nothing but slow down the computer clock speed.

You control your fighters by steering with the right joystick. The ship responds to the joystick like an old plane with a control stick. You can shoot by pressing either joystick button. If you have chosen a mode in which you can control speed, the left joystick acts as a throttle. This is confusing as well as awkward, and play would be much easier if speed were controlled on the keyboard.

Project Nebula has strong points as well as weak areas. On the positive side are the life-like actions of the enemy ships. As the distance between you and the enemy rapidly decreases they become larger and more detailed. Unlike other space games, the attackers move around, trying to evade your shots while attempting to cripple your ship with devastating rocket blasts. Another plus for this program are the variations of game modes and skill levels which make it a hard game to master.

Among the flaws which detract from the general appeal of the game are the obnoxious "sound effects." The static that crackles from the TV speaker is annoying and distracting. Fortunately this problem is easily remedied by turning down the volume control on the set.

The only other major complaint concerns the documentation, which leaves something to be desired. The instructions are extremely brief, and so vague are the docking instructions that I have yet to do so successfully.

On the whole, Project Nebula is an adequate program. The game is good—not great—and has a reasonable amount of entertainment value. Before plunking down the money for the Rom-Pak, ask your Radio Shack dealer for a demonstration to see if the game is right for you. ☐

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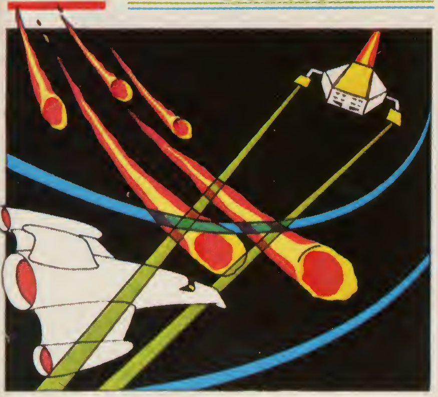

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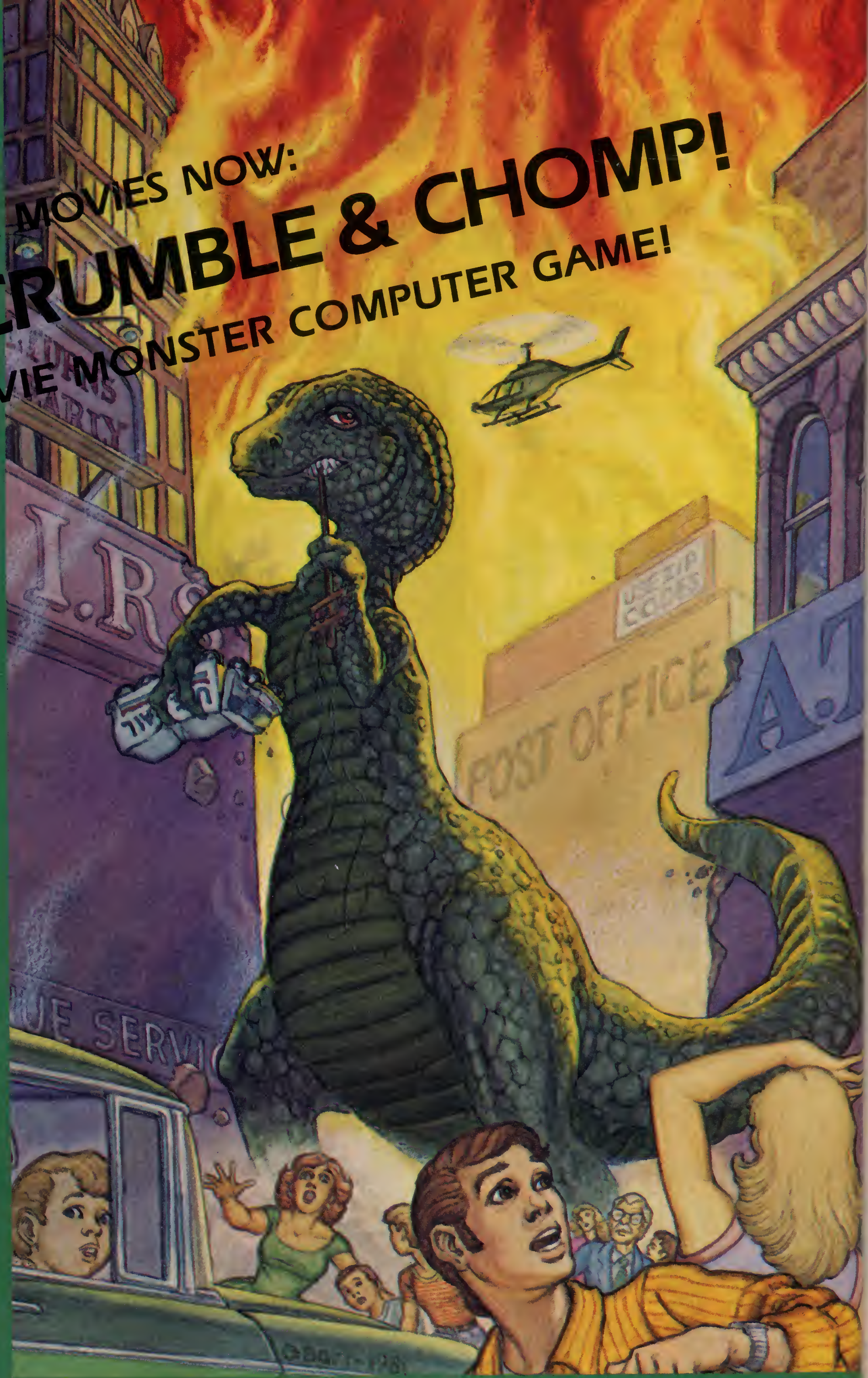

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CIRCLE 156 ON READER SERVICE CARD

Atari Arcade Games: The State of the Art

David Small

creative computing
SOFTWARE PROFILE

Name: Asteroids, Missile Command
Type: Arcade games
System: Atari with 16K RAM, joystick(s)
Format: ROM cartridge
Language: Machine Language
Summary: Good versions of popular games.
Price: $39.95 each
Manufacturer:
Atari, Inc.
1265 Borregas Ave.
Sunnyvale, CA 94086

The Atari personal computer has been around for a couple of years now, and some good software is finally being written for it. For some time, the only software available was (usually) either written in Basic and/or translated from some other machine, usually the Apple. None of these programs really took advantage of the capabilities of the Atari.

Now there are quite a few programs available which use the features of the Atari, not just the subset of them required to translate a program from another machine. They use high speed, quality graphics and sound, and were written specifically for the Atari.

This review will cover two of what we consider "State of the Art" game software for the Atari.

They are from Atari Inc., and are clones of the Atari arcade games Asteroids and Missile Command. Not surprisingly, they bear the same names.

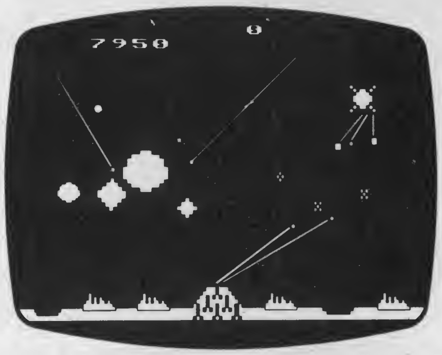
Both are on ROM cartridges which plug into the lefthand slot. Both cost $39.95, and require 16K RAM (no disk needed) and joystick(s).

David Small, 11314 Yucca Dr., Austin, TX 78750.

Missile Command

This is a popular arcade game in which an evil foreign power launches a missile attack against the area you defend. You command anti-ballistic missiles, which you shoot to intercept the incoming missiles, satellites, planes and smart bombs.

In the arcade version, a "trackball" is used to move the cursor for aiming. It allows very high speed movement, and very sensitive positioning. (For example, hitting a "smart missile" exactly on its position is required to destroy it; otherwise the missile dodges). Since no "trackball" exists for the personal computer, a joystick is used.



Missile Command.

Sound effects include an "air raid siren," various explosions, and so forth. They are quite familiar to anyone who has played the arcade game, and make good use of the Atari's capabilities.

Visual effects are also rather well done. There are no longer three missile bases controlled by three buttons, as there are in the arcade version. Instead, there is one, with "underground reloading" which enables it to be destroyed, yet pop up with new missiles a bit later. There are three missile bases in one, all controlled by the joystick button.

The enemy starts with single missiles, moving slowly, then escalates to MIRV's (missiles which break into multiple missiles), satellites and planes (both of which drop missiles), and finally smart bombs which dodge explosions on the way down. Everything begins to move faster, the bombs get more dense, and so forth, until you are finally overwhelmed. As in the arcade version a bonus city is awarded for every 10,000 points.

There are several variations of missile command. An attack consisting solely of smart bombs can be ordered up, if desired, to allow practice with them (a very useful option). There is also a two-player version, and an option to "freeze" the game if you want to get another beer.

Rating

I rated this game the better of the two. It is excellently done with one exception, and that's the joystick handler. I found it very difficult to position the cursor precisely.

The problem is twofold. First, the cursor moves up/down/right/left at the same speed, but moves diagonally as a double increment of up-right, down-left, etc. This makes the diagonal move functionally faster than the others, which makes linear motion darn near impossible. I found myself firing multiple missiles near the same point, and constantly missing. The fine control of the arcade version was missing.

I'm not sure how this could be changed. Perhaps the diagonals could be slowed down a bit and some sort of fine position enabled, with coarse movement occurring a bit later on the same joystick press.

I found the home game just as challenging as the arcade version; my top score seems to be limited by not being able to position the cursor with enough accuracy. (Particularly important with smart bombs.)

Despite my reservations, this is a good game. It's not a replacement for Star Raiders, but it is well done and fun to play. Nor does it get boring after a few turns. I recommend it.

(Continued on page 143)

THE ATARI GOES TO WAR

George Blank

creative computing
SOFTWARE PROFILE
Name: Eastern Front
Type: War Game
System: Atari 400 or 800
Format: Cassette, Disk, MicroNet download
Language: Machine
Summary: Outstanding Computer War Game
Price: $23.25 to $29.95
Manufacturer:
Atari Program Exchange
P.O. Box 427
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Why would a multimillionaire ex-movie star seek a job as President of the United States with a salary of a mere $200,000 a year, or the head of a major corporation join the Cabinet with a salary even lower? The answer is that of all the success drives that captivate the human imagination, the strongest is the lust for power. Power is far headier than sex, wealth, or fame, and may make the others easier to obtain.

No exercise of power can compare with the job of a commanding general in time of war, marshaling millions of soldiers and the industrial resources of many nations in an all-out drive for supremacy on a battlefield that covers a continent. One of the largest such campaigns in human history was Operation Barbarossa, the German invasion of Russia that began in the summer of 1941. During the course of this four year campaign, nearly 20 million human lives were lost. Eastern Front, one of the best microcomputer war games ever produced, allows the player to take on the role of the commander of the German army, and try to do better than the German forces actually did.

Nearly every aspect of the game is a technical masterpiece.

In the past, among war games, board games have had a major advantage over computer games. War gamers like to operate on a theatre level, with an overview of dozens or even hundreds of units scattered over a wide area. Until now the limitations of computer displays have made it difficult to get a satisfying situation map.

Special Features

In Eastern Front, Chris Crawford has produced the first really satisfactory solution to the display problem by using the fast fine-scrolling ability of the Atari computer to produce a magnificent map of Eastern Russia that occupies ten display screens.

Nearly every aspect of the game is a technical masterpiece. Eighteen colors are used on the screen at a time. Player missile graphics are used to move a cursor over the map to give instructions without disturbing the map underneath. Several different redefined character sets permit the natural mixing of a colorful and detailed terrain with a text display. Display list interrupts are used to set the weather conditions, with ice gradually taking over the rivers in winter and receding in the spring, and making the player deal with mud and snow at different times in different areas.

The program uses intricate artificial intelligence routines and multiprocessing to control the Russians and their allies. This means that the longer the German player takes to form his strategy, the better the Russian strategy will be. The Russian side can analyze its position, recognize danger and opportunity, avoid traffic jams, recognize the effects of terrain, and plan accordingly.

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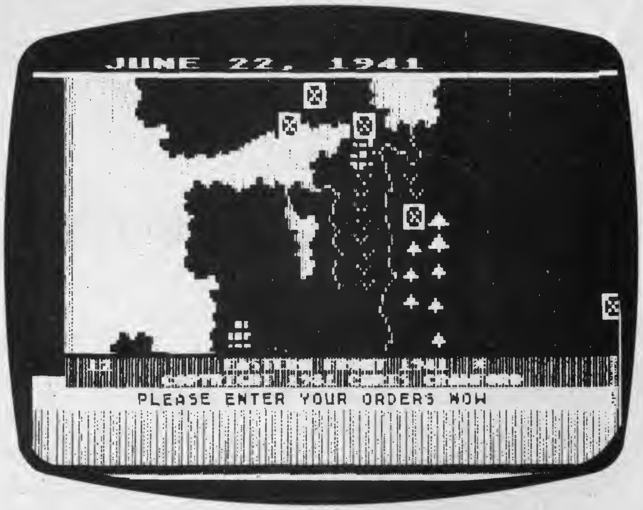

JUNE 22, 1941

PLEASE ENTER YOUR ORDERS NOW

Figure 1. The opening display of Eastern Front shows the Baltic Sea, with two Finnish Infantry Units (German Allies) in Finland and three Russian infantry units. This black and white picture does not distinguish between the units, but the Russians are red and the Axis are white. The city in the top center of the screen, directly below a Russian unit, is Leningrad.

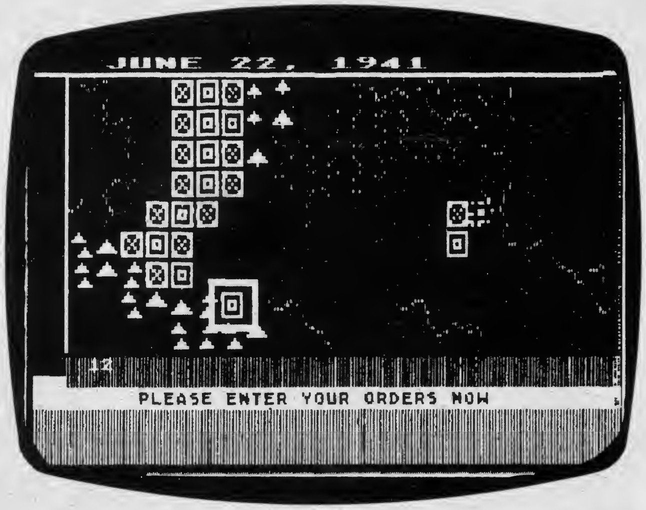

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Figure 2. German and Russian units face each other in Central Poland. This display shows mountains, rivers, forests, marshes, and the city of Kiev, along with Russian and German Infantry and Armor units. The cursor is over a Russian Unit. Pressing the button would cause the unit to disappear, identifying the terrain underneath, and also display information on the unit; in this case, the 4th Russian Tank Army, a weak unit with a muster level of 79 and a current strength of 77.

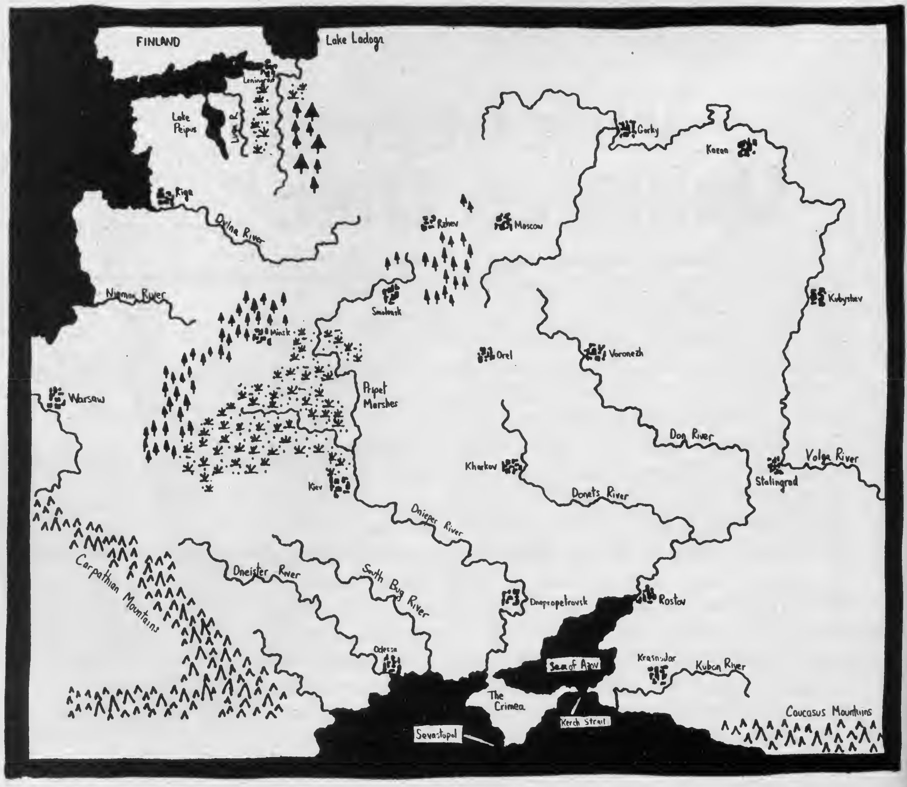
The human engineering of the game is also a major accomplishment, with all information entered by the player using only the joystick, trigger button, start button, and space bar. This eliminates the drudgery of most war gaming. The multiprocessing even allows the German player to move the cursor around and view different sections of the map while the battles are taking place. Of course, since all battles and movement are real time, it is impossible to see everything that is happening. Excellent sound effects do indicate the extent of the overall action.

The computer adds a great deal to wargaming, particularly by providing a dynamic environment in place of the static nature of board games. Each turn, representing one week of actual time, is broken down into 32 time periods in which units move and fight. Thus a player might program a particular unit to attack an adjacent enemy unit and move toward a city. During the course of a single turn, that unit might destroy the first enemy unit, move forward to engage a unit behind it, force the second enemy to retreat, turn toward the city, and engage in battle a third enemy unit that has come up from the reserves during the turn. Terrain affects both movement and combat, with rivers, forests, marshes, mountians, and cities to complicate strategy.

Playing the Game

At the beginning of the game the German commander has the advantages of concentrated force, short supply lines and superior mobility. However, the Russians have overwhelming numbers, vast territory, and the Russian winter on their side. The object of the game for the German commander is to push as large a force as possible as far East as possible and maintain them. Extra points are awarded for capturing key Russian cities. The Russians are trying to move their forces West, which also affects the German player's score. The score, which is calculated from week to week, can range from 0 to 255 points. It is fairly easy to get a high score by early fall, but nearly impossible to hold that advantage over the winter.

During the war, large concentrations of German troops were bogged down in the Pripet marshes between Minsk and Kiev, allowing the Russians to concentrate their forces. This is a recipe for disaster in the game, as it was also a German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Kubyshev
Minsk
Orel
Voronezh
Warsaw
Pripet Marshes
Don River
Kharkov
Volga River
Stalingrad
Kiev
Donets River
Dnieper River
Carpathian Mountains
Dneister River
South Bug River
Dnepropetrovsk
Rostov
Odessa
Sea of Azov
Krasnodar
Kuban River
The Crimea
Kerch Strait
Sevastopol
Caucasus Mountains

Figure 3. The instruction book contains a map of the whole area covered by the game. Only one tenth of this area is displayed on the screen at one time.

disaster in real life. My own best strategies have involved splitting up my forces to prevent the Russians from concentrating theirs, and avoiding combat with superior mobility unless I had overwhelming superiority. Another possibility might be to crash through the Pripet marshes and break into open territory beyond, splitting forces at that time. Uncertain winter supply lines require that the German player draw back during that season.

Regardless of my strategy, my success rate in my first ten games was abysmal. The game ends automatically after the week of March 29, 1942, and in nine of my games my score was 0 on that date. In the one game where I held a score to the end, I seized the city of Leningrad (worth 10 points) and defended it to practically my last man. My total score was 10 points.

After many hours of play, I found only a few real weaknesses. Giving all those instructions with the joystick can give you a sore palm and wrist. The lack of a clear-cut set of victory conditions is frustrating, as is the overwhelming advantage of the Russians. I would also like an option to be able to see the whole theatre at once, however limited the detail might be at that time. The designer mentions in the instructions that test players became frustrated with random logistics problems and traffic jams, but I tend to think these are realistically handled.

I have no hesitation in calling this one of the very best war games available for a personal computer.

Recommendation

I have no hesitation in calling this one of the very best war games available for a personal computer. It is also a virtuoso demonstration of the awesome built-in capabilities of the Atari computer. This game literally could not be done on any other computer in as satisfactory an execution. By all means, if you are at all interested in strategy games, buy it.

If you are a serious war gamer, buy it even if you have to buy a computer in order to run it. Eastern Front comes on disk, requiring 32K of RAM, for $29.95. It is also available on cassette, requiring 16K of RAM, for $26.95. The cassette version can be downloaded from MicroNet at a price of $23.25. ☐

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CIRCLE 158 ON READER SERVICE CARD

Epoch and Hadron from Sirius

A New Look for Arcade Games

David Lubar

You can almost always find well known phrases that represent conflicting concepts. While one faction glibly says, "There is nothing new under the sun," others are heard to mutter, "There are more things in heaven and earth than are dreamt of in your philosophy." Fortunately for all of us, there are those who not only heed the second bit of wisdom, but take the creative leap and produce work that shines with a new light. This is the case with *Epoch* and *Hadron*.

We've all grown used to the general appearance of Apple graphics. Though many of the new games are visually pleasing, and some achieve a beauty of form and motion, they all share some common traits. *Epoch* and *Hadron* have a new look unlike any program yet done for the Apple. Ships and space stations with a large variety of architecture approach the player, moving from small points to huge images that more than fill the screen. Some scintillate and change color as they approach. All have a fresh appearance that leaves one to wonder why no one has hit upon this technique before. Of course, graphics alone will not guarantee a good game. Fortunately, these programs fare well in all areas. Let's look at *Epoch* first.

creative computing
SOFTWARE PROFILE

Name: Epoch
Type: Game
System: 48K Apple, Disk Drive, (Joystick recommended)
Format: Disk
Language: Machine Language
Summary: A new approach to graphics.
Price: $34.95
Manufacturer:
Sirius Software
10364 Rockingham Dr.
Sacramento, CA 95827

Epoch

The player is in control of a ship with a limited amount of fuel and ammunition. Adding to his worry, time is also in limited supply. If it runs out, the game is over. The display contains a large crosshair at the center. Beyond lie a galaxy of stars and a horde of enemy ships.

Playing with a joystick, the player flies through space. Button 0 decreases his speed, button 1 increases it. If both buttons are pressed, the player fires a torpedo. While the main goal is to amass points by destroying enemy ships, the player can only survive if he regains fuel and time periodically.

Fuel is lost with every turn. If you have trim pots on your joystick, you'll want to adjust them until the ship is moving straight ahead. Otherwise, the constant turning will quickly consume your fuel. To refuel, the player must fly through a friendly base. This also replenishes his ammunition.

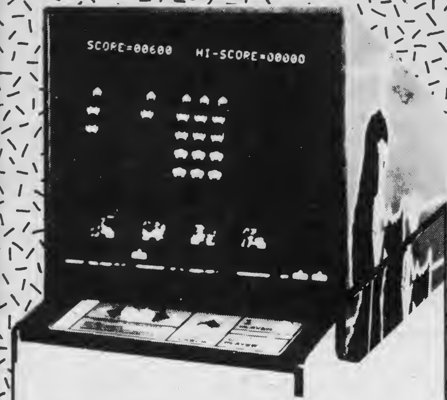
Time is regained by entering a time portal. This in itself is a mini-game. Once the player enters the portal, he has to weave through a time tunnel. The longer and faster his trip, the more time is regained. Since a flight through a time portal requires fuel, and a trip through a base requires time, the player must carefully manage all his resources.

Combine the graphics with the above concepts and you have a good game. If one were to look for a negative side, only two minor matters appear. First, objects are not tracked when they leave the screen. If a ship flies to the left of the player and goes off the edge, the player won't find that ship if he turns. This, however, can come in handy when you want to evade an enemy. By careful juggling, you can get rid of other ships while keeping a base or time portal on the screen. Still, it's more fun to shoot the enemy.

Second, some of the three-dimensional effect is lost when the ship turns. All objects move across the screen, but they maintain their relative separation, even if one is much closer than another. Objects in the foreground don't move off the screen faster than those in the background. These are minor points, and don't detract from *Epoch* as a game.

(Continued on page 147)

THE creative computing software ARCADE

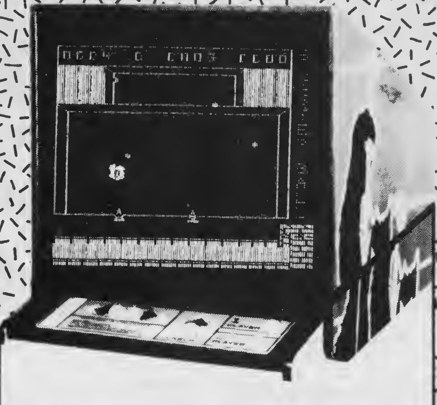


Super Invasion
Apple II (requires paddles)
licensed from Astar International
48K Diskette DOS 3.3 CS-4505 $19.95
16K Cassette CS-4006 $19.95
Sorcerer 16K Cassette CS-5011 $19.95
by Matt Hickey

This is the original arcade game, with superb high resolution graphics, high speed action, nail biting tension, and hilarious antics by the moon creatures. Fifty five aliens whiz across the screen, quickening their descent, challenging you to come out from behind your blockades and pick them off with your lasers before they bomb you, destroy your shields, or drop down right on top of you.

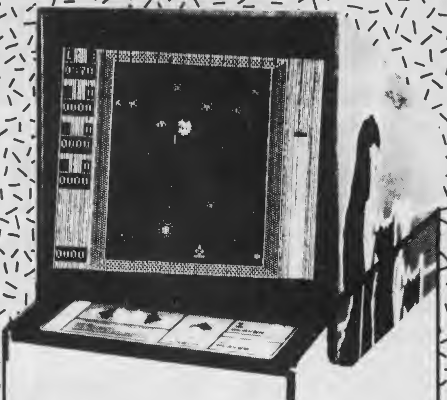
Super Invasion by John Varela
32K TRS-80 Model I Diskette CS-3520 $19.95
16K TRS-80 Cassette CS-3020 $19.95

A low resolution, high speed arcade game similar to our Apple and Sorcerer versions. The aliens move back and forth across the screen, dropping ever lower to attack you as you attempt to destroy them with your lasers.



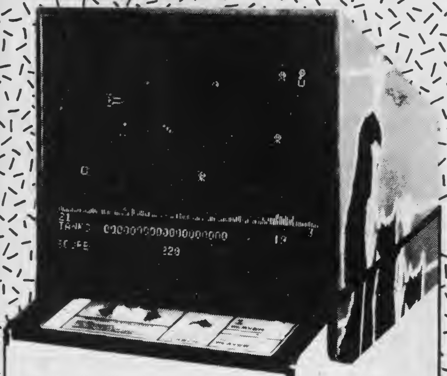
Blisterball and **Mad Bomber**
By Rodney McCauley
Apple II 48K Diskette DOS 3.3 (requires paddles) CS-4511 $24.95

A frantic, fast paced romp that can be played for hours, **Blisterball** is the first truly original arcade-type game for a home computer. As the bouncing balls drop from above, the player moves his laser base and tries to shoot them. It's easy at first—with just one ball. Then come two, then three. It's getting harder. Four balls come, and finally five. Surviving them, the player gets to shoot at inelastic bonus balls. If he makes it this far, the second round starts. The balls bounce lower, the walls close in. Shades of Poe and Newton! Making Superb use of Apple graphics and sound, **Blisterball** can be played by one or two people. **Mad Bomber**, included on the same disk, is another fast paced arcade game. Racks of bombs fill up above you. Whenever four bombs are in any rack, they start to fall. You can shoot them either in the rack or while they are falling, but since there are racks all across the top of the screen, you need to stay ahead of them to survive.



Tsunami
by Rodney McCauley
Apple II 48K Diskette DOS 3.3 (requires paddles) CS-4526 $29.95

Wave after wave of alien attackers attempt to overwhelm your defenses. Each wave comes in a different formation and uses different attack and defense strategies. You get dozens of superior arcade games combined into one program. If you ever master the first set of games on the diskette, where the attackers are without shields, then you are ready for the second set. This time the attackers are sheltered by shields. They can drop bombs right through the shields, but you cannot shoot through them. Successive waves use different strategies. Some move from shield to shield, allowing you to shoot while they are in between. Others just come out briefly to attack, and you must have fast reflexes to get them. Bonus points are awarded for beating the clock, with a countdown timer displayed on screen. This may be our finest arcade game ever!



Torax
by Erol Pekoz
Apple II 48K Diskette DOS 3.3 (requires paddles) CS-4520 $24.95

Defend your home planet against the invading Torids! Try to protect your nuclear fuel tanks, which the aliens are intent on stealing. The Torids drop down, steal a fuel tank and rise up to escape. They are also armed, and will not hesitate to shoot at you. While you whiz by the surface of your planet at incredible speed, you must avoid enemy fire, maneuver your ship, and try to shoot down the Torids without hitting the fuel tanks!

MISSILES 9
SCORE= 12

ICBM
Audio visual licensed from Atari, Inc.
32K TRS-80 Model I Diskette CS-3521 $19.95
16K TRS-80 Cassette CS-3021 $19.95

TRS-80 version of the popular arcade game where you must destroy incoming missiles with your own anti-ballistic missiles before they destroy your cities with nuclear warheads.

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TRS-80

Sorcerer Apple II

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Space Chase *(Swifty Software) 16K* Nifty eye-hand coordination tests... If you clear one galaxy of "planets" and avoid destruction at the hands of an alien ship you are rewarded by an attack by two aliens and then three. Game keeps score and displays high score. Colorful graphics and good playing. Cassette $14.95

Rescue at Rigel *(Automated Simulations) 32K* Ten people from the Orion colony at Ultima Thule (including your favorite female) have been captured. Your mother ship must leave in 60 minutes. As "Sudden" Smith, you must find and release them, but it won't be easy in the maze of corridors, rooms and levels. Oh, by the way, the place is crawling with tollahs, High Tollahs and robots. Will you make it? Cassette $29.95

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(New!) Rear Guard *(Adventure International) 16K-T, 24 K-D* This space battle puts you in charge of a speeding jet skimming an alien surface battling waves of enemy vessels. Advanced features include running high score, two player option, advanced difficulty levels. Full uses of ATARI graphics and sounds. Superb horizontal scrolling. Intro price $17.95 tape, $22.95 disc

(New!) Shadow Hawk One *(Horizon Simulations) 48K* Futuristic computer game of space faring piracy. Your warship Shadow Hawk One is all that's left of the Noble Free Space Confederation. You prey on the enemy empire's merchant fleet capturing raw materials which you can trade for better weaponry, shielding and missiles. 3-D game requires a full 48 K memory and it uses every bit in one of the most spectacular games ever released for ATARI. Retails for $49.95. Our price $44.95 disc

Crush, Crumble and Chomp *(Automated Simulations) 32K* Tired of destroying countless monsters? This one is for you. You are the monster. Pick from six. You may be the giant amphibian, Goshilla. Knock down the Golden Gate bridge or tip over the Empire State Building. But look out for the National Guard. You pick the goal and see if you can make it. Five objectives. Cassette or disc $29.95

Bridge 2.0 *(Dynacomp) 24K* Now you can practice your bridge at home before you have to embarrass yourself at the neighbors. Bridge 2.0 bids (Goren) and plays both contract and duplicate bridge. It even doubles if you get carried away with your bidding. No graphics, but clearly arranged format makes playing easy. Cassette $17.95

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Space Games for the Apple

Dale Archibald

creative computing

SOFTWARE PROFILE

Name: Genetic Drift
Type: Arcade
System: Apple II or II Plus, 48K
Format: DOS 3.2 or 3.3 disk
Language: Machine
Summary: A finger-tangling typewriting takeoff
Price: $29.95
Manufacturer:
Broderbund Software
2 Vista Wood Way,
San Rafael, CA 94901

Is your tan generated by your monitor? Is your idea of exercise running upstairs to the bathroom between games of Super Invader? Can you still see your shoes when you're standing up?

I'm sure you've read science fiction stories in which people in the 24th century are undersized, paunchy, bald, enormous-headed types. Are we computer users establishing the evolutionary and genetic patterns leading to that future?

Broderbund has hope for us, and published *Genetic Drift* by Scott Schram to keep our wits sharp and our typing fingers muscular.

The training regimen begins with a funny graphic, nearly as good as the illustration on the package.

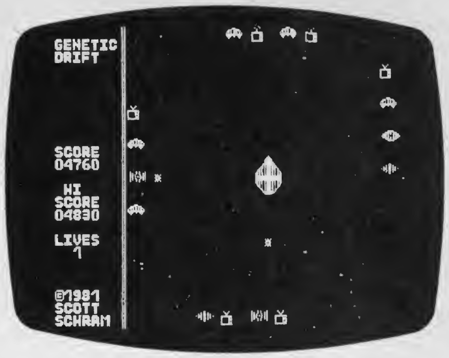
You start with a diamond figure framed by four lines of four shapes. These move up and down, or back and forth, depending upon whether they are horizontal or vertical.

As they do their slow promenade, the shapes unleash squares of genetic garbage at you. Allow them to strike the center diamond, and you're dead.

You begin with three lives (although you can add more as you score points and levels).

To destroy the garbage and change the dancing shapes into benign life forms (appropriately shaped like little TVs, complete with rabbit ears), you must zap them. You aim up by hitting "Y," left with "G,", right with "J," and down with the space bar. To fire a single shot, use ESC. To fire in all directions at once, you hit A. This will only work a few times per level, however.

Let's assume you have turned the right-hand quartet into three benign TV sets and a little bowtie. That quartet will continue to fire garbage at you.



If you fire and the garbage disappears from in front of a TV before it is struck, you are quite likely to change the TV into an unfriendly life form. That form must be mutated back into a tube.

On the other hand, if you hit the lone bowtie and change it into a TV, the entire row will be (mostly) benign. It will send little hearts announcing undying friendliness. Occasionally, though, the hearts are upside down. If you shoot a heart, the entire row destabilizes and mutates into unfriendly forms. If you don't shoot an inverted heart, the same will occur.

Here, too, the upsidedown heart may evaporate just as you fire. You destabilize all the friendlies by mutating one.

Once you have mutated all four quartets, you earn a short break before moving on to the next level.

Dale Archibald, 1817 Third Ave. N., Minneapolis, MN 55405.

Space Quarks is a graceful choreograph of a shoot 'em up.

As you go along, the forms fire faster and faster. The run-of-the-mill hateful forms are joined by radioactive chunks flinging matter at you, and these must be hit as many as six times before they evolve.

Onslaughts rapidly become hectic in *Genetic Drift* as garbage, hearts and upsidedown hearts zip toward the center. It will sharpen your reflexes and the speed with which you can type everyday words such as "JYG" and "YGG," or "GY G".

No quarter or rest is given, aside from the little breaks between levels. But if you don't mind wearing down the tops of the same three keys and the space bar — not to mention the tips of your fingers — you'll love this game.

Space Quarks

Broderbund has an exceptional line of tempting games. This one, written by staff designer Chris Jochumson, Space Quarks is a graceful choreograph of a shoot 'em up.

creative computing

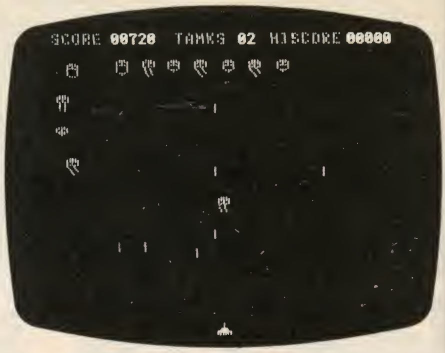
SOFTWARE PROFILE

Name: Space Quarks
Type: Arcade
System: Apple II or II Plus, 48K
Format: DOS 3.2 or 3.3 disk
Language: Machine
Summary: Zap dancers to the music of the spheres
Price: $29.95
Manufacturer:
Broderbund Software
2 Vista Wood Way
San Rafael, CA 94901

First, the menu at the beginning of the game lets you choose the paddle you want to use, whether you want sound, etc. Press Return and you're ready to research *Space Quarks*.

At the bottom of the screen is a slow-reacting "riboflavin injector." Above it is a dancing group of shapes: the quarks. These come in different shapes and bright colors.

As the quarks change their paths from straight lines to graceful curves and circles, you must inject them. Some simply explode when struck; others do a kamikaze dive at the injector. Hit a diver, and all shapes begin dropping bombs.



If you learn to discern which quarks simply explode without rousing the entire swarm, you can pick them off without rousing the others. Leave the divers to reach the highest altitude so you will have time to try to avoid their attacks once you fire on them.

You begin with three injectors, and earn another each time you clear a screen. Each of the four screens has different shaped quarks dancing a different dance. As long as you don't fire, you are safe.

At a certain level in the game, the shapes all become the same color, and you can no longer easily pick out the innocuous ones from the divers.

The movement of the quarks is very smooth, but the slowness of the injector can be very frustrating. ☐

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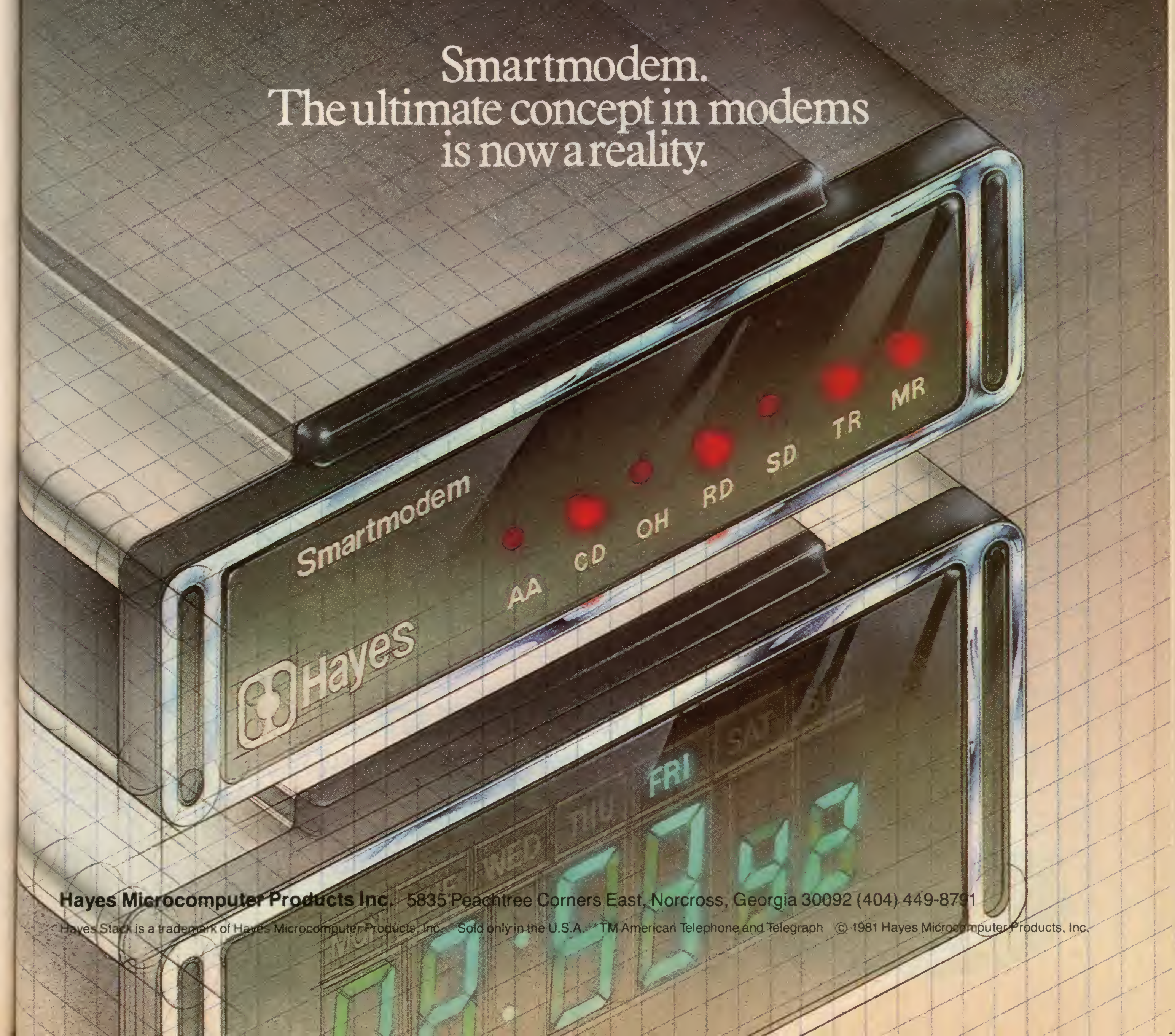

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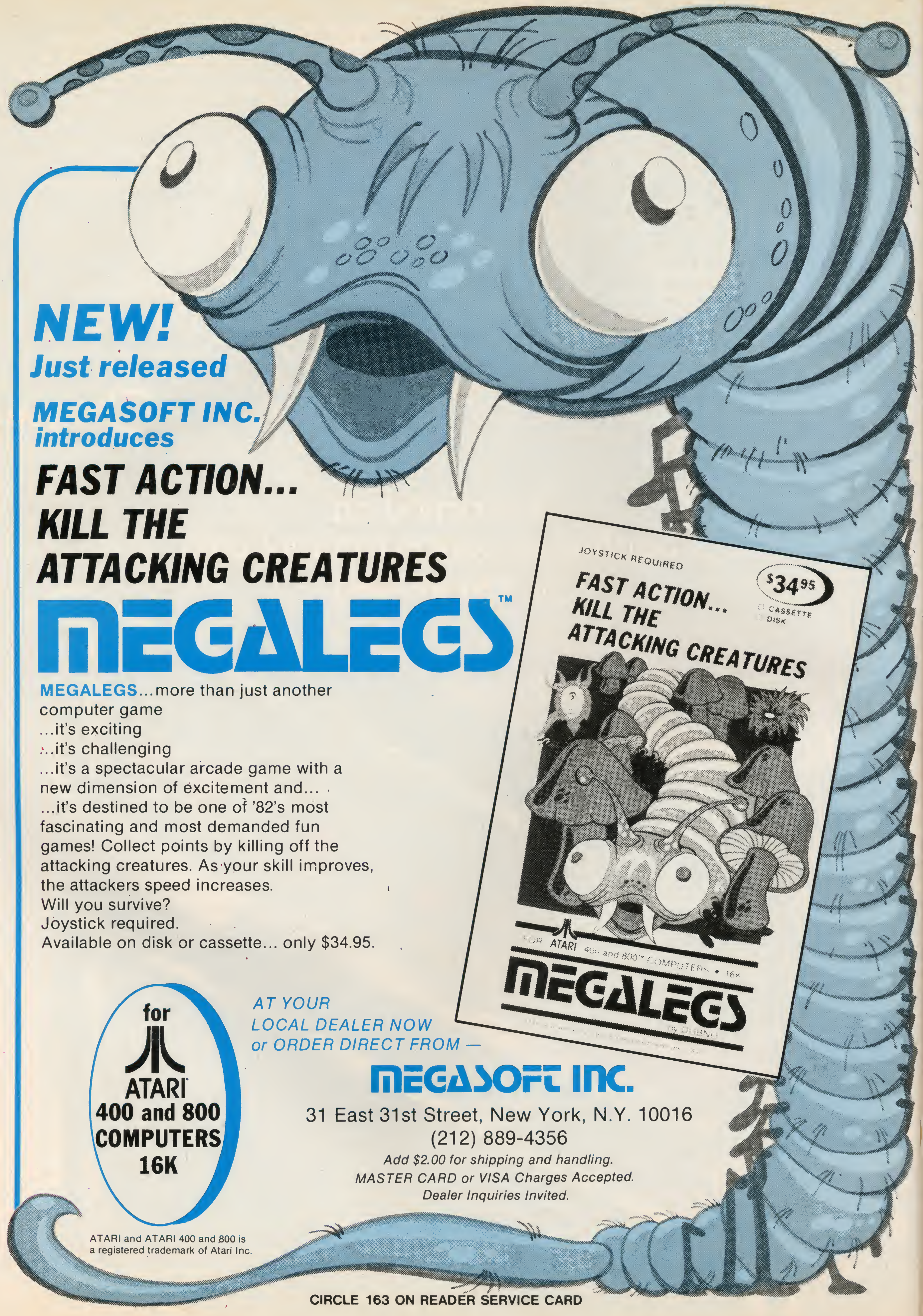
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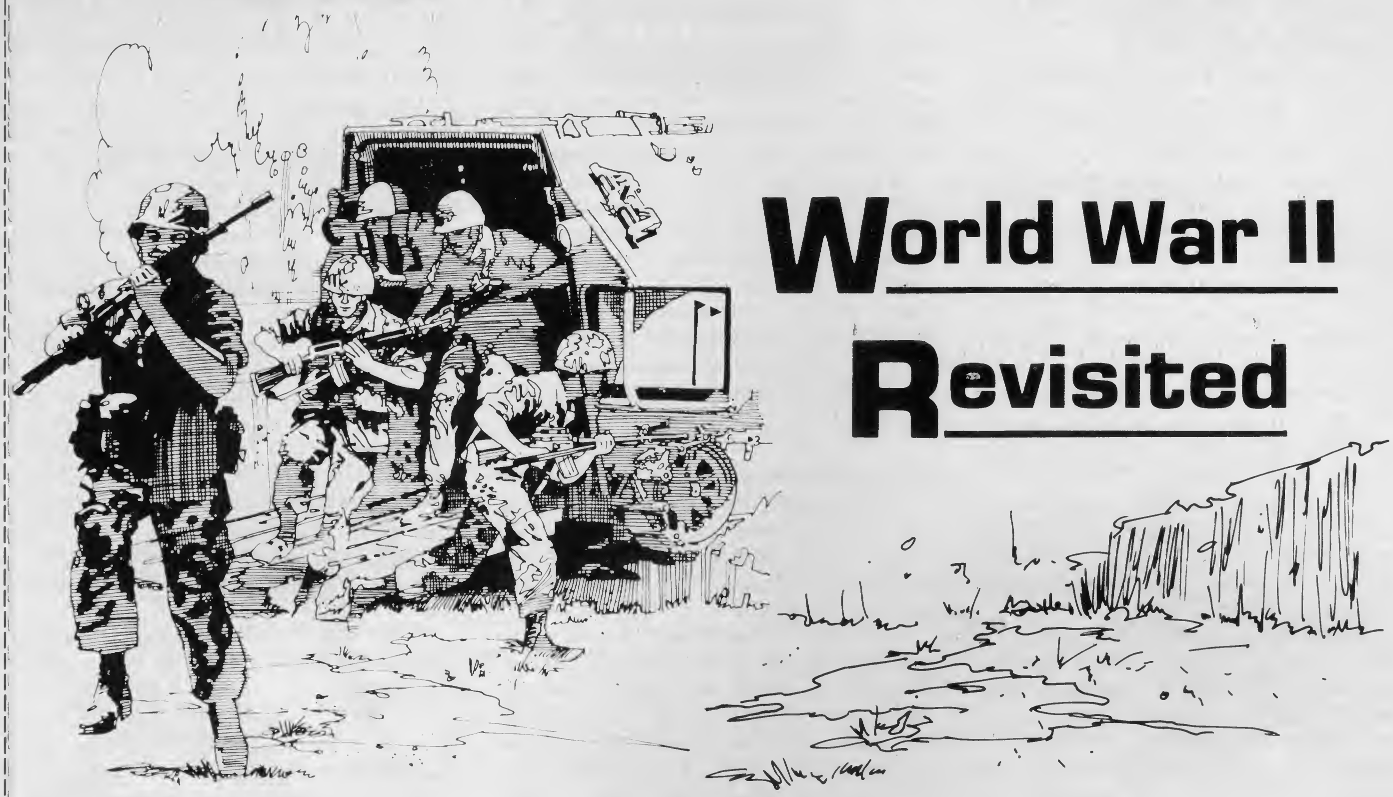

World War II Revisited

George Miller

Games are an abstraction of reality. One of the simplest games is the Oriental game of Go which is a fight for territory. The rules of Chess are more complex than Go and the game more closely resembles a battlefield. The microcomputer allows the submersion of rules in the bowels of a program and frees the participant from the details allowing him to concentrate on clever strategies and sweeping plans of attack.

Strategic Simulations has introduced a new computer game called Operation Apocalypse which simulates major World War II land operations. It requires a 48K Apple II with Applesoft ROM Card or an Apple II Plus and one disk drive. The game is actually four games in one since it has four different scenarios representing four different WWII battle operations.

The battlefield is laid out before the players on the Apple screen. Battle movements are shown in color as tanks and troops march across the terrain and the sounds of battle are heard as the artillery is fired or forces engage in combat.

My only previous contacts with wargaming were Risk, Diplomacy, and Stratego, parlor games played with markers on a board (if you don't remember, ask your father). I seem to have stepped into the latest rendition of a genre unknown to all but a fanatical group of war-gaming freaks. One reason you have to be fanatical to be a war-gamer is that it ofen takes a great deal of time to learn the rules and play the game. The computer changes all of that.

The most complicated part of the Operation Apocalypse rules is listed in an appendix as the combat resolution tables. The players need not read these since the computer knows them and resolves all combat accordingly. The computer also keeps a running score to let you know which side is winning. The eight-page instruction book can be read, but it is more fun to put the game into automatic mode and watch the computer take over the playing of both the Allies and the Germans.

For two hours you can sit in front of the screen and watch the raging tides of war as the computer plays itself. You can pick up most of the rules of the game just by watching. The next step is to ask the computer to play the part of the Germans as you assume command of the Allies. You can choose between two levels of difficulty which govern the strategy used by the computer, and you can choose whether or not your forces are invisible (a la Stratego). I made the mistake of going into invisible mode and promptly lost track of all my troops. (The game comes with two plastic boards and pens for keeping track of invisible units.) After honing my skills on the computer I invited one of my friends over for a session and let him be the Allies while I took control of the German army.

Each game lasts about three hours, but allows plenty of opportunities for saving the game so you can continue at a later date. There is a real time element which allows you only a certain amount of time to decide where to move before the computer passes on to the next phase. The element of chance is provided not only in random terrain setup and combat resolution, but also in a comical fashion called panic moves: sometimes the computer

creative computing
SOFTWARE PROFILE

Name: Operation Apocalypse
Type: War
System: 48K Apple with Applesoft, Disk Drive
Format: Disk
Language: Applesoft
Summary: Excellent
Price: $59.95
Manufacturer:
Strategic Simulations, Inc.
465 Fairchild Dr.
Suite 108
Mountain View, CA 94043

George Miller, 2426 Bush St., San Francisco, CA 94115.

will decide that one of your units has panicked and madly moves the unit randomly about, often mucking up your carefully figured plans.

The packaging of Operation Apocalypse is superb. Inside an attractive box are found the rules, a game selection card, a floppy disk, two plastic record charts outlining the 7 x 18 hexagonal battlefield grid, and four color pens for marking your hidden troops. The materials are of high quality. The instructions are beautifully typeset. (IBM are you listening?) Stategic Simulations, Inc. has their act together. They know how to write computer software which has no bugs (I haven't come across any after many hours of play), and they have an extremely user-friendly presentation. (Just put the disk in, turn your machine on, and away you go.) All this for $59.95.

The business software products sold for large mainframe computers look shoddy by comparison and often sell for hundreds of thousands of dollars. Has no one else noticed this disparity?

I shall describe in detail just one of the four games that come with Operation Apocalypse: Advance to Contact. As mentioned before, even though there are elaborate rules in the game, the computer knows them and will tell you when you make an illegal move and describe your possible correct moves.

The main difference in the four games is the objective or victory conditions. The objective in Advance to Contact is to take control of, and hold the cities. The hex grid painted in color on the screen represents a valley which has become a key point in the Allied advance. Units are dispatched to take the towns and hold them before the German player can organize and set up defensive positions that would hold back the advance.

The Germans see what is happening and quickly dispatch units to the area. The Allied units enter from the left side of the screen and the German units enter from the right side. There is a river which crosses the valley. There are open plains, cites, forests and rough terrain in the valley which have varying effects on the movement of troops and the combat of forces. Each side receives 15 units in turns 1-10. The game lasts 20 turns.

There are four types of units in this scenario: tanks, infantry, artillery and engineering units. Each type of unit has different characteristics. The tank battalion, for example, can be set to any one of six modes: defense, normal, transport, fire, attack, and reorganization. The tank battalion cannot move in defense mode, but can resist strong attacks from the enemy (good for holding cities once captured). The transporation mode allows the battalion to move long distances but leaves it vulnerable to attack. The fire mode allows the tank to fire a short distance over rivers or lend support to its own troops from behind the lines. The attack mode allows only limited movement, but quickly destroys an enemy not in attack or defense mode. The reorganization mode allows no movement and is very vulnerable, but permits a unit to build up strength.

A player may selectively change the mode of each of his units at the beginning of each turn. You may either change from any mode to normal mode or from normal mode to any other mode (i.e. to go from attack mode to defense mode takes two turns: attack-normal-defense). The engineering units have an interesting mode which allows them to build a bridge across a river.

Playing The Game

The computer first randomly constructs the hex grid containing the layout of the valley. The Commander of the Allied forces goes first and must follow the following sequence of play:

1. Artillery Arrival Phase. There is some artillery off the screen which can be directed to certain parts of the valley. The player's turn starts with an artillery bombardment. There is nothing to do here except watch various cells of the grid flash as they are hit and listen to the awful sound of explosions.

2. Artillery Plotting Phase. Here is where the player can make a strategic decision. By directing the cursor to various cells of the grid, he can indicate where the next round of artillery will hit on the next turn. You must be careful to remember where you aimed since you may wind up bombarding your own troops next turn.

3. On-Board Artillery Phase. Any tank or artillery battalion you have on the screen which is in Fire mode can be fired. You must be quick and indicate exactly where the fire is directed or the computer will just move on to the next phase.

4. Reorganization Phase. All units in the reorganization mode will take on more strength. This phase is automatic and the players don't see anything on the screen.

5. Mode Change Phase. The player gets the opportunity to change the mode of all units under his command except artillery units which fired in the previous artillery fire phase.

6. Landing Phase. Paratroop units that are scheduled to arrive in this turn land at predetermined drop zones. Seaborne units will land. Units arrive in attack mode except artillery units which arrive in normal mode. The Advance to Contact scenario has no paratroopers or seaborne units so this phase is not used.

7. Movement Phase. This is the most important phase—the one where a player can move any unit which is in a mode which permits movement. When a unit moves into a cell adjacent to an enemy unit then combat automatically takes place (the exception to this is the night moves which take place every fifth turn). The combat between rival forces is resolved by the computer which determines the losses to each side. The strength of each unit is reduced by the appropriate amount. If the strength of a unit drops below 1 then the unit disappears forever from the game and the victor can advance into the emptied cell and continue his attack (if he is in the attack mode). To move a unit, the player types in a number from one to six indicating which one of the six cells around his hex he wishes to occupy. The unit then moves in that direction (if he is not blocked). You get to see, pictured on the screen, the tank or infantry man trudge into the adjacent hex accompanied by a ticking sound not unlike the syncopated rhythm of marching feet. When two opposing forces meet, the combat is represented by a flashing light and an explosive sound.

At the end of each turn the computer displays the score, indicating which side is winning.

Suggestions for Improvement

I guess it is only human nature to want better after being shown the best. After whetting my appetite for computer simulations, Operation Apocalypse has inspired me to imagine ways to improve the game. Although the computer has reduced a game from days to hours of playing time, I still felt a need for more action. The movement of units was too slow (about ten seconds) for my trigger happy fingers. The invisibility aspect was poorly addressed, and offering cards for you to use in keeping track of your men eliminates the advantages of having the computer do the tedium for you. Stratego is nice in that your men remain visible to you, but invisible to your opponent. This is impossible on the screen. Furthermore, the turns take a long time, leaving you and your opponent alternately bored. How about a simulation which incorporates two microcomputers with each player having his own screen showing him only his own men and allowing the players simultaneous moves?

Operation Apocalypse represents hundreds of hours of playing pleasure, a most worthwhile investment. The rules are clearly and briefly explained. The various scenarios and random terrains provide endless tests of one's military prowess. I foresee these computer games stepping closer and closer to reality, and try not to think that they may be training the generals of future wars who might do battle on screens much like the ones described above. ☐

Apple II T.M.

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Adventures 7, 8, & 9

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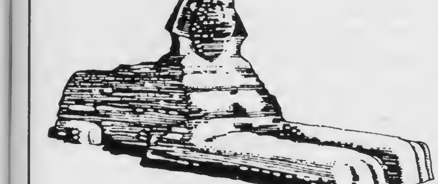
Requires 32K TRS-80 Model I



7. **Mystery Fun House** (by Scott Adams). Can you find your way completely through the strangest Fun House in existence, or will you always be kicked out when the park closes?....

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Adventures 10, 11, & 12

Disk CS-4524 $29.95
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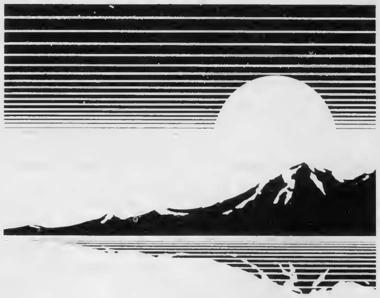

Scott Adams's Adventures

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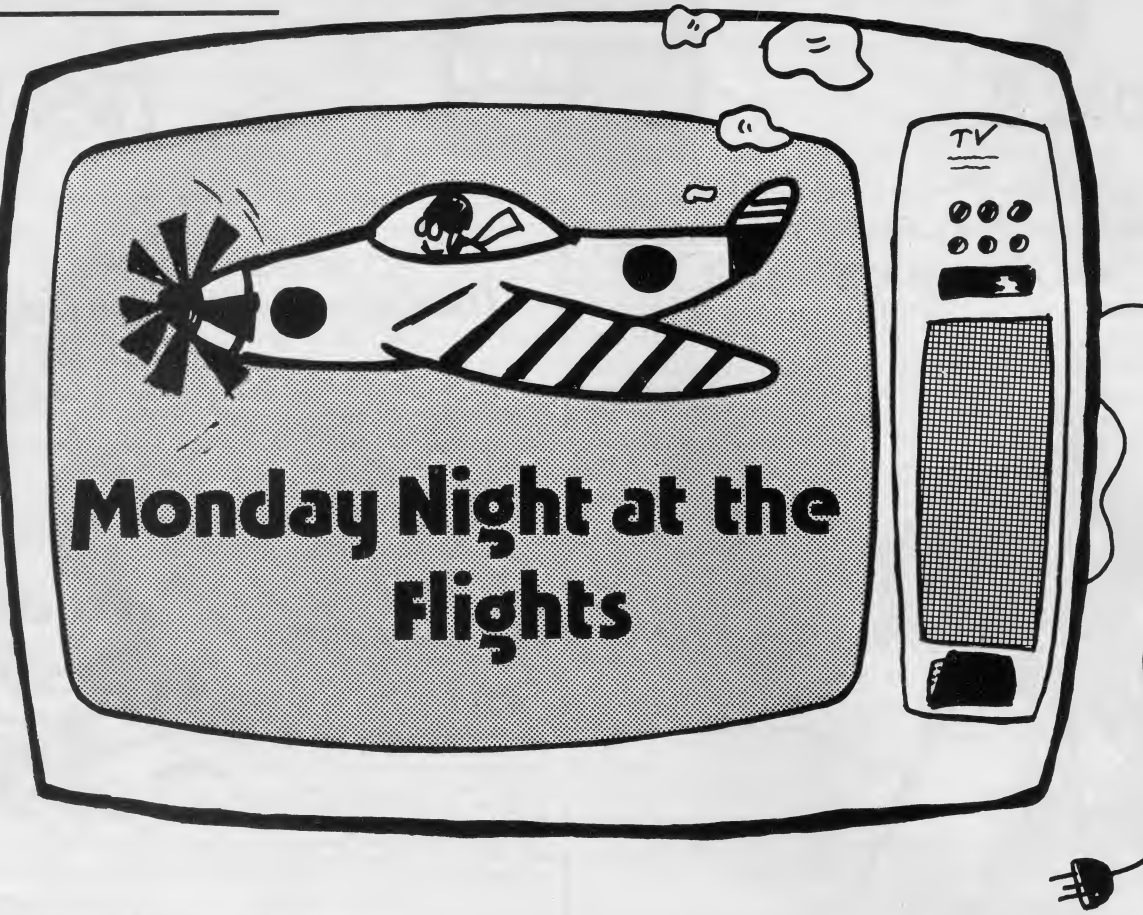

Monday Night at the Flights

Dale Archibald

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SOFTWARE PROFILE
Name: Computer Air Combat
Type: Strategic Air Combat Simulation
System: 48K Apple II+ or II with Applesoft in ROM, one disk drive
Format: Mixed graphics and text
Language: Applesoft
Summary: Great
Price: $59.95
Manufacturer:
Strategic Simulations, Inc.
465 Fairchild Dr.
Suite 108
Mountain View, CA 94043

My regular Monday night wargaming opponent and I had finished playing a computer game about 10:00. Basking in the warm glow of victory for a change, I decided to unwrap my brand new copy of Computer Air Combat, from Strategic Simulations, Inc. (SSI). I jammed the floppy into the disk drive without even looking at the 18-page 8 1/2" by 11" instruction book, game selection card, map boards, aircraft data cards, or any of the other items in the box. After all, we were experienced computer gamers. Only beginners read instructions.

The screen prompted us to select among multi-player Air Race, solitaire-only V-1 Intercept and Night Fighter, or solitaire/two-player Bomber Intercept, and Dogfight. Since it was late, we decided the V-1 scenario would be best: fast and easy.

We watched the screen and waited for the first V-1 to fly into sight while the lone aircraft flew north forever. My friend left at 10:30 without seeing anything appear, so I grudgingly decided to thumb through the instruction book before I went off to bed. Then I unearthed the game selection card from the assortment of literature in the box. "Eureka," I should have cried.

I finally got to bed about 1:30 a.m. after several unsuccessful V-1 chases. As a writer about computers and games, I have to understand totally how they work, you see. Er, at any rate, I decided to take another little shot at the V-1s after breakfast. Just a few minutes, just to be able to write about the game.

I quit to eat lunch, but didn't turn my Apple II off. In fact, I brought a sandwich to it (first time that's happened). I finally summoned the willpower to shut it down at dinnertime.

It took me the better part of a week to get my mania under control.

By now, you know I like it, of course. SSI and the game designers, Charles Merrow and Jack T. Avery, have come up with a real winner.

Those of you who have played other SSI titles are familiar with the firm's attention to detail. Computer Bismarck, for example, was based on the Nazi pocket battleship Bismarck's attempt to smash through the British Home Fleet. Computer Ambush took a squad step-by-step through a bombed-out village in Occupied France.

Computer Air Combat combines the best features of those games and adds many new twists of its own, particularly the third dimension of altitude.

In Bismarck, the entire game was spent trying to find the enemy. The combat itself was secondary. Not so here.

In Ambush, there were so many factors to consider that it took a long time for the computer to determine what happened. Not so here.

The program uses the flight characteristics of 36 different WWII aircraft as a foundation. These range from the British Spitfire I to the American B-29 Superfortress, the Japanese A6M2 Zero Sen (Zeke) to the German Me 262A-1 jet fighter.

In the Bomber Intercept scenario, for

Dale Archibald, 1817 Third Ave. N., Minneapolis, MN 55405.

instance, the player and opponent may choose a total of 16 aircraft of four types (interceptors against bombers and fighter escort) to be deployed. Dogfight matches fighter against fighter, again either randomly or with starting location, altitude, speed, etc., determined by the players. (Even a scramble from ground level is possible.) Yet when I matched five aircraft against the Apple's five, it took just a little over two minutes before it was time for me to move again.

There are general commands for the total flight, and specific commands for the individual planes. Global Plot, for instance, shows all sighted ships, friendly and enemy, as if you were looking down from above. But if an enemy aircraft can't be spotted by one of your pilots, it won't show on the screen until it can be.

The general command Position Report lists all information on sighted aircraft, including X and Y coordinates. You mark these on the map boards in grease pencil.

Status Report describes the damage a friendly aircraft has sustained, and the amount of ammunition remaining.

Movement shows a graphic plot from above of all aircraft 6,000 feet ahead, 2,000 feet behind, and 7,000 feet to the sides of the subject aircraft, at the beginning of the move. Listed underneath is the speed, altitude, and other information about the plane.

Tactical plot shows the same view after movement of all ships of both players.

If an enemy craft is within firing range *and* at the right altitude, *and* if the nose of the ship is at the right angle *and* you have ammunition left, you can fire. Combat can be selected after the Tactical plot. You are asked if you want to fire at possible targets, given the distances, etc.

Of course, there is a Quit and save game feature.

Movement

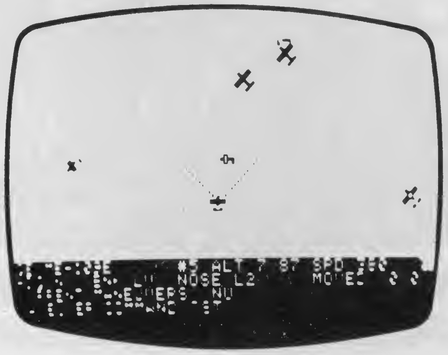
Moving aircraft to get them into battle is the most complex part of the game, and rightly so. Among other elements, movement depends upon the type of aircraft, speed, direction, altitude, bank and nose attitude. Both players' ships move at the same time, even though they enter their maneuver orders at different times.

There are nine possible maneuvers:

ST-Straight ahead
RR-Roll Right (a selected 45-180 degrees)
RL-Roll Left (same selection)
TR-Turn Right (45-degree direction change)
TL-Turn Left (same change left)
SR-Sideslip Right (move to right without changing heading)
SL-Sideslip Left
NU-Nose Up
ND-Nose Down.

Each maneuver requires a certain distance change, depending upon type, speed, and altitude.

Speed is reduced with every maneuver except ST. It can be altered by throttling back in level flight, climbing, or diving. Go into a climb at too slow a speed, and your ship will stall. When it recovers from its out-of-control dive, your direction and altitude will have changed.



The roll maneuvers are perhaps the most important submaneuvers. (See Figure 1.) These change the bank altitude of the individual aircraft, and that affects turns, sideslips, climbs and dives.

Under the graphic during Movement mode are various listings, such as speed, altitude, present maneuver, etc., and bank. A bank of LV signals that the craft is level. A description of R1 (right roll, one point) means the ship is at a 45-degree angle to the horizon. R2 signals the wings are straight up and down at 90 degrees. The IR designation means the ship is inverted 135 degrees from the horizon, to the right. When it's level, but upside down, the caption is IV.

The ship continues through IL, L2, and L1 back to LV again. On the screen, each position is symbolized by a different graphic. Asking for an ID of any aircraft on the screen elicits its nationality, type, speed, heading, altitude, bank attitude, etc.

One last command is CK for Check capabilities. This gives a three-line summary of the capabilities of the aircraft you're flying, updated as you perform maneuvers.

Other factors in the game are Visibility, Combat Damage, and Ammunition Supply.

Joel Billings, president of SSI, said the company plans to bring out a supplementary disk of other aircraft from other fronts. It will be possible to arrange some very exotic matchups when that comes on the market.

Nevertheless, even with the present game, it will be difficult to exhaust the possibilities. Pilots can be aces, average, or inexperienced; matchups of combatants can be changed; scenarios can be tailored to actual air battles, and so on.

Weak spots? The instructions could be a bit clearer to emphasize certain key points. I'd also like to see illustrations on maneuvers. My friend would enjoy seeing action when moves are made, instead of just a listing of hits. But these are minor complaints.

Overall, I consider this one of the finest computer games of its type I've yet played. It is expensive but well worth $59.95 to those who like this type of strategic, thought provoking pastime. Detailed and comparatively fast-paced, Computer Air Combat is a marvelous game. ☐

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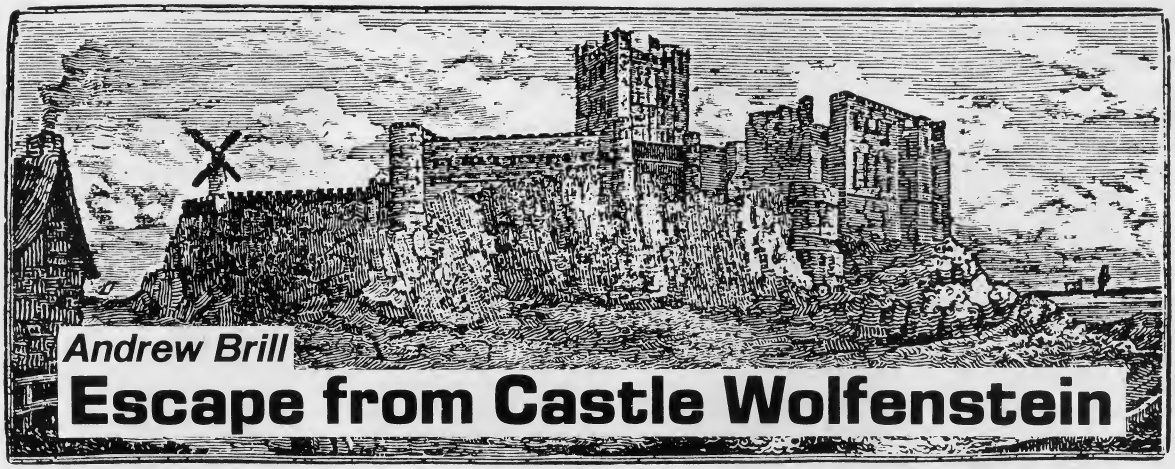

Andrew Brill

Escape from Castle Wolfenstein

Imagine how excited I was when, after using the Apple in the Editorial department of Creative Computing for nothing but mundane record keeping, several new games appeared on my desk for review. I began to drool as my grubby little hands booted the games for the first time. One of them, Castle Wolfenstein from Muse, has made me an addict.

After the almost endless list of tedious instructions for playing Castle Wolfenstein, an Allied prisoner shows up in the first room of a maze of adjoining rooms that is guarded by Nazi soldiers. The mission is to maneuver the Allied soldier past cruel Nazi guards and sadistic SS stormtroopers, recover the secret war plans, and escape the deadly confines of Castle Wolfenstein.

Armed with a gun loaded with ten bullets, the Allied captive attempts to kill Nazi guards who scream with piercing shrillness when shot. After shooting a Nazi, the prisoner can search him for such goodies as bullets, grenades, and door keys by standing over the dead body and pressing the space bar. However, the prisoner can take bullets from a dead guard only if the gaurd's clip contains more than the prisoner's supply. Sometimes a gaurd will surrender to the prisoner when an empty gun is pointed at him from point-blank range. Then the prisoner can search the guard and shoot him with his own ammunition.

creative computing

SOFTWARE PROFILE

Name: Castle Wolfenstein

Type: Action/Adventure game

System: Apple II or II Plus with 48K, Applesoft ROM

Format: Disk

Language: Machine Language

Summary: Challenging and interesting game

Price: $29.95

Manufacturer:
Muse Software, Inc.
347 N. Charles St.
Baltimore, MD 21201

Once the pesky Nazis are eliminated from the first room, the prisoner can search the supply chests that are located in most of the rooms by pointing his gun at the chest and pressing the space bar. By pressing the 'U' key, the prisoner obtains the contents of the chest. The contents of these chests enable the prisoner to replenish depleted supplies of bullets and grenades; he may also find Nazi uniforms and bulletproof vests. Once the prisoner is wearing the uniform and vest, he can wander from room to room unnoticed by all Nazis except the SS men. The SS stormtroopers are particularly nasty whelming power. They are hard to destroy, and it usually takes a direct hit from a grenade to kill them. Often, a missed attempt at killing a stormtrooper spells a quick, sure end for the Allied prisoner.

Once the prisoner has a full supply of ten bullets, three grenades, and is wearing the uniform and vest, all he needs to complete his escape are the war plans. But the road to escape is long and hard, and blocked by ruthless Nazis.

There are many pitfalls to hinder the escape of the Allied prisoner. Depleted supplies of bullets and grenades, confusing paths of escape, and frequent encounters with the seemingly unconquerable SS stormtroopers all contribute to a very low success rate.

Castle Wolfenstein is not without its annoying features. One of them is its irritating habit of disrupting the game's graphic layout when the Allied prisoner accidentally bumps into a wall. But the most frustrating feature is the length of time it takes to escape. This is due mainly to the time it takes to open the supply chests. Even more frustrating is waiting a

CASTLE
Wolfenstein
BY SILAS S. WARNER
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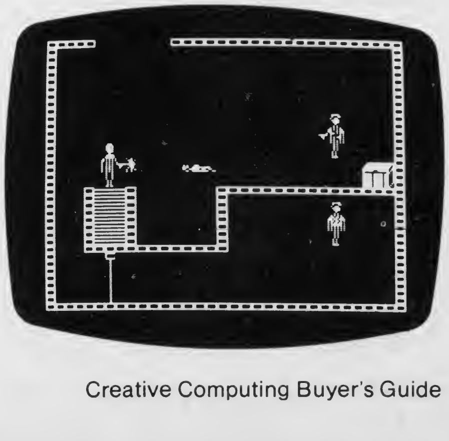


long time for a chest to open only to find that it contains something completely useless like sauerkraut, bratwurst, or schnapps.

Shooting bullets at a chest cuts down the amount of time it takes to open it but also diminishes the supply of bullets. You quickly learn that patience is the most important virtue when playing Castle Wolfenstein.

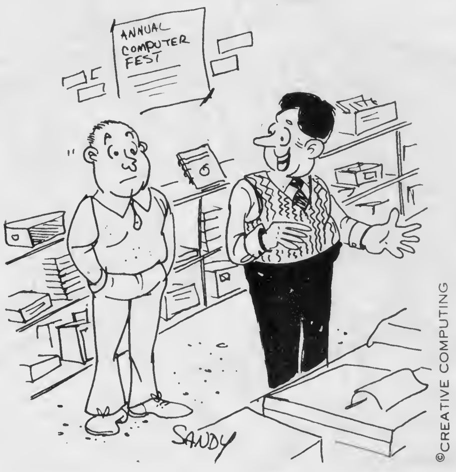
With a little luck and a lot of patience, you can escape from the castle. If you are lucky enough to escape with the war plans, you will definitely be promoted in rank; if you escape without the plans, you may or may not be promoted. With each escape, the layout of the castle changes and escape becomes more difficult.

The graphics of the game are simple but effective. The three different soldiers—the Allied prisoner, Nazi soldiers, and SS men—are easily distinguished from each other by their clothing. The prisoner (unless he is wearing a Nazi uniform or vest) has no distinctive markings; an ordinary Nazi soldier has a dark uniform with a stripe across it; and the powerful stormtroopers wear the ominous letters SS on their vest.

Explosions are brightly flashed on the screen to signal the demise of the prisoner and the end of the game. Escaping from the castle is depicted by the escaped prisoner triumphantly standing out on an open drawbridge with the brightened sky overhead filled with birds.

Castle Wolfenstein can be played with a joystick or paddle, or on a keyboard. The joystick allows for the easiest maneuverability, while the keyboard is the most difficult of the three controls to direct movement.

Castle Wolfenstein may be a little slow to play, but the thrill of the escape is worth the wait. Auf wiedersehn! ☐



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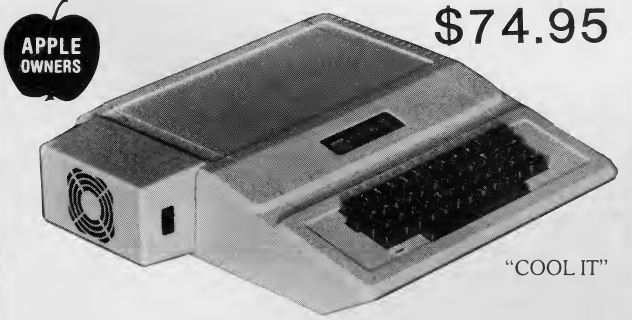

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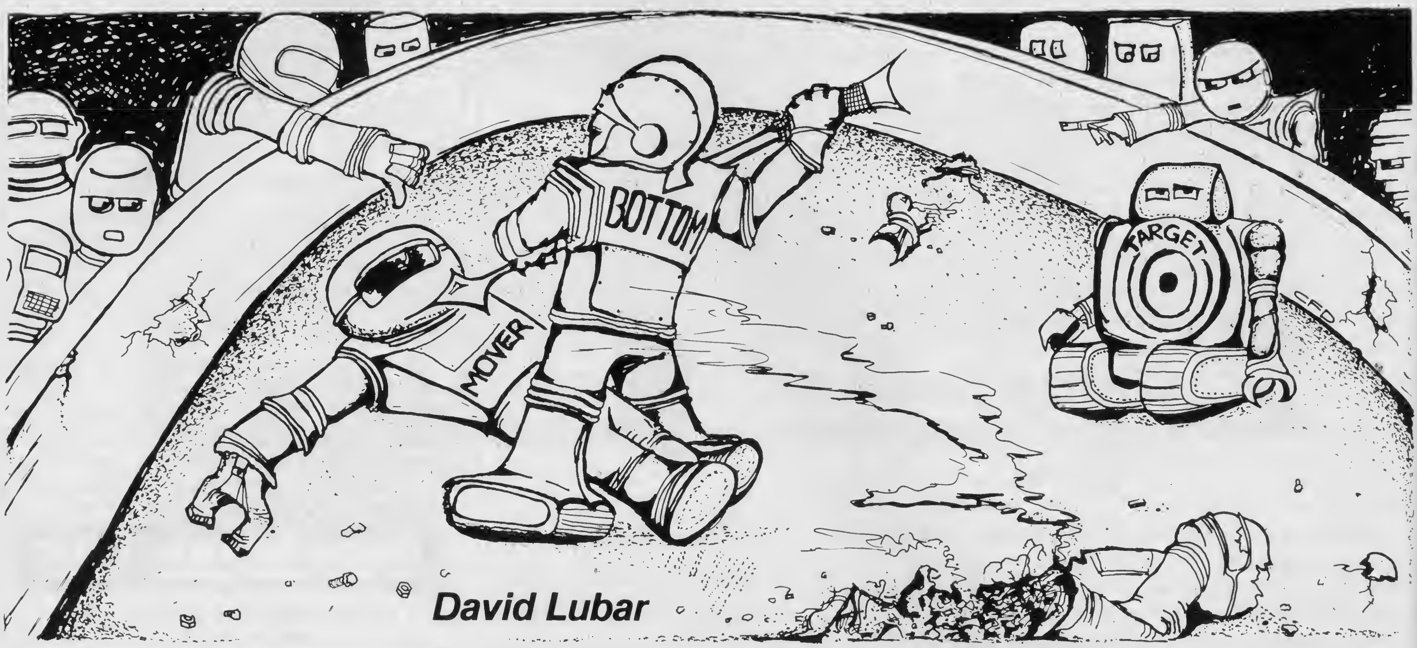
CIRCLE 168 ON READER SERVICE CARD

ROBOTWAR



David Lubar

creative computing

SOFTWARE PROFILE

Name: Robotwar
Type: Game
System: 48K Apple II, Applesoft, Disk Drive
Format: Disk
Language: Machine language
Summary: Complete game system for developing gladiator robots
Price: $39.95
Manufacturer: Muse Software, Inc.
347 N. Charles St.
Baltimore, MD 21201

His name is Bottom. His battle plan has carried him through scores of contests in the arena. Bottom always seeks the south wall of the arena, hugs it and moves back and forth while aiming his radar to the north. But Bottom is blind to his flanks. During the battle, Mover slips down, locks on his target, and fires. Bottom keeps coming. Mover shoots again. They collide and both are damaged. But the shots have taken their toll. Bottom succumbs. Mover senses his damage and goes to a new location. He spots another target. But this one moves before Mover fires. The shell flies past the target. Mover scans clockwise with his radar. He finds the target again. This time he doesn't miss. He stands alone in the arena, the enemies are gone.

Bottom and Mover are two inhabitants of the universe of *Robotwar*. They have been programmed to find and destroy all who enter the arena. Were this all that occurred, Robotwar from Muse would be just another game. But there is more. Robotwar is a full system that allows the user to program and test his own robots. Among other things, this makes Robotwar an excellent educational tool.

Robot Talk

Bottom and his disk mates are programmed in a special robot assembly language. In essence, each robot acts as a small central processing unit. Actions are carried out by sending values to specific registers within the robot. For instance, the RADAR register activates the radar of the robot. A value from 0 to 355 can be placed in the register, causing the robot to send a beam at the appropriate angle. At this point the RADAR register will contain a new value indicating the result of the radar beam. The absolute value of this number tells the distance to the spotted object. The sign of the number tells the type of object. Walls return a positive value; other robots return a negative value. The robots also contain an AIM register which is used for pointing a gun, a SHOT register which fires a projectile, SPEEDX and SPEEDY registers to control movement, a DAMAGE register which indicates the percent of injury sustained, a RANDOM register for generating random numbers, and X and Y registers to indicate position. There are twenty-four storage registers and an INDEX register. The storage registers are for holding values. The index allows the programmer to address registers indirectly. Each register has a number. Thus, if SPEEDX is number seven, you can place a seven in the INDEX register and any access to INDEX will actually access SPEEDX. This is a powerful capability. For instance, by putting a base number plus a random value into INDEX, you can randomly access either SPEEDX or SPEEDY.

O.K., there is a set of registers. What can you do with them? Well, the robot language also contains a set of commands. A value can be sent to a register with the TO command. A TO B takes the value in A and places it in B. Arithmetic operations are allowed, such as A<5 TO SPEEDX. The flexibility of the robots is increased with GOTO and GOSUB, and their "intelligence" amplified with IF statements. Putting it all together, a simple scan and shoot routine would be:

```
LOOP
AIM+5 TO AIM
AIM TO RADAR
IF RADAR<0 THEN GOSUB SHOOT
GOTO LOOP
SHOOT
0-RADAR TO SHOT
ENDSUB
```

In this example, LOOP is a label. The next line increases the aim of the gun. If the radar reading is less than zero, a robot has been spotted. In this case, the SHOOT subroutine is called. Placing the distance of the robot (0-RADAR) into SHOT causes a shell to go in the direction of AIM and explode at the instructed distance. ENDSUB causes the program to return from the subroutine and continue execution at the line following the call.

The above, of course, is just one possible program segment. There are many ways to use radar, and many strategies. This is part of the value of Robotwar. Owners of the disk are enticed into creating better, more effective robots. If two robots employ the same strategy, the one using more efficient code will probably triumph. The user begins to ask questions such as "What if radar oscillated instead of sweeping?" or "How large an increment can be used without too much risk of scanning past a target?" These "what ifs" can be put to the test. In the arena, program flaws become painfully obvious, but there is a less painful way to test robots. The disk contains a test bench which executes the code and displays register contents. Radar spottings and damage can be simulated. In essence, the test bench provides full debugging features, including single step and trace.

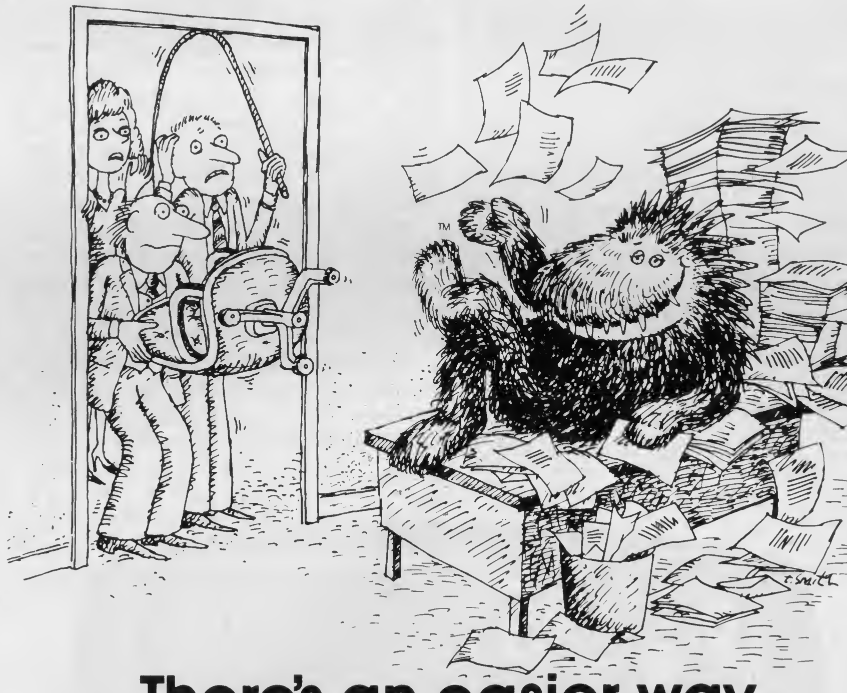
Let's step through some features of the disk. The menu begins with an option to put robots into the arena. If this is selected, the user sees a roster of available robots. From two to five can be selected. Once the choice is made, the battle begins. The robots appear as square, hexagonal, or octagonal shapes, each of which is distinctive. The side of the arena contains a display showing each shape, the name of the robot, percent of damage, and score. Every time a robot is destroyed, the survivors gain a point. Radar is shown by a white flash, the aim of the gun is indicated with a line inside the robot. Projectiles are small dots. Each robot in turn carries out an order. Since this is a sequential process, the program speeds up as robots are eliminated. With two robots, the action is quite fast.

Even* Target, *whose strategy is to sit in place and do nothing, has been known to win once in a while.

Instead of a single battle, the user can schedule a tournament. Here, a running score is kept, allowing robots to be tested for long-term performance. It is possible for an inferior robot to win occasionally, but unlikely that such a robot will win a tournament. Even Target, whose strategy is to sit in place and do nothing, has been known to win once in a while.

The editor for writing robot code is a version of Supertext, and is easy to use. Since labels are allowed, the code doesn't require line numbers. The language is simple enough for beginners, but sophisticated enough to allow for a wide range of robots. Once the code is written, the source and object files can be saved to the master disk, or to a specially formatted backup. Disks can be initialized from the program, which is good since the master disk has limited free space. A robot on a backup disk must be transferred to the master before entering a tournament. This is an easy process which is fully explained in the documentation.

The manual contains full instructions for programming robots, including many examples of different routines, and clear descriptions of registers and robot language. The only weakness in the system is the use of several different units of measurement. The arena is 400 meters across. The X and Y locations of the robot are given as values from 0 to 255, while the speed of the robots is given in decimeters. Aside from this, *Robotwar* is both an excellent game and an excellent learning tool. ☐



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CIRCLE 169 ON READER SERVICE CARD

FLIPPING OUT

Dale Archibald

creative computing
SOFTWARE PROFILE
Name: Raster Blaster
Type: Pinball machine
System: 48K Apple II or II Plus, single disk drive
Format: Graphics
Language: Machine
Summary: Super graphics
Price: $29.95
Manufacturer:
BudgeCo.
428 Pela Ave.
Piedmont, CA 94611

Apple owners who aren't familiar with Bill Budge should make his acquaintance. He was one of the first—and one of the best—at using the color graphics of the Apple to their greatest advantage. Some of his past works include Tranquility Base for Stoneware, and Space Album and Game Trilogy for California Pacific.

With Raster Blaster, Budge has added pinball wizardry to his repertoire. I didn't appreciate how good he was until I saw this game. The color, sound effects, and action are all superb.

As many as four people can play on two difficulty levels. I've only played on the easy level, with ball-saving shields always in place. On hard, the six center targets have to be hit before the shields come on; then, they only last for one ball.

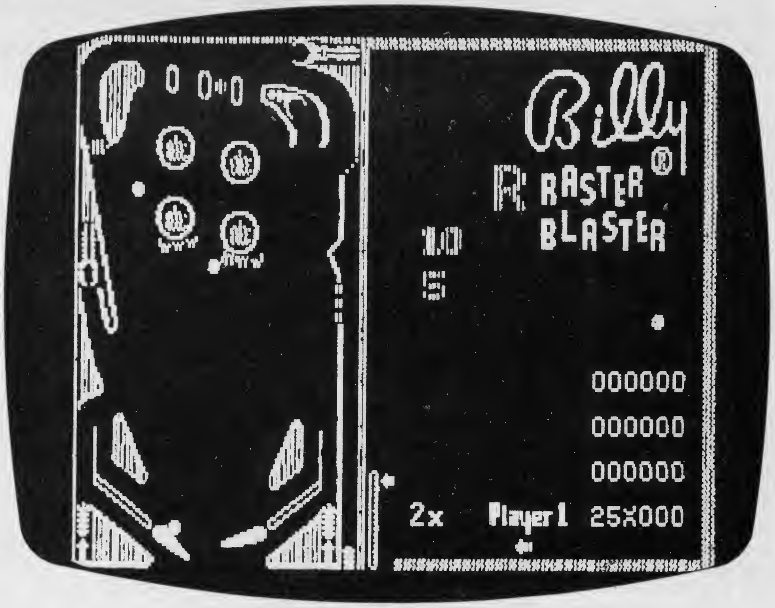
There are two flippers operated by the game paddles, a force gauge to select how hard to shoot the ball, a tilt selector, four lane lights, three side targets, six center targets (small apples), four round center bumpers (large Apples), two side bumpers, Raster Blaster claws that grab a ball once you've hit all six center targets, and spinners.

All these features combine to create an almost perfect pinball game...perfect enough to form calluses on your flipper-pushing thumbs. Lights flash, noises sound, and the ball flips, bumps, and rolls just right.

Extra points are earned for completing all the lane lights, hitting all three side targets, hitting the six center targets and grabbing three balls in the claws (at which point all are dropped for four-ball play).

The "almost perfect" has to do with the operation of the flippers. At times, a ball traveling down the channel toward the flipper will speed up without warning. Also, if a ball is caught on the flipper after rolling down the channel, it doesn't bounce away; it just keeps bouncing off the flipper. But these are minor flaws.

I'm not much of a pinball player myself, but I can see where a person could save a lot of money with this program and a large color TV. For parties it's a natural awe-striker; the graphics are so impressive. It's also a great way to keep the kids away from those nasty folks down at the pinball parlor. Unless, of course, the kids invite them home to help. ☐



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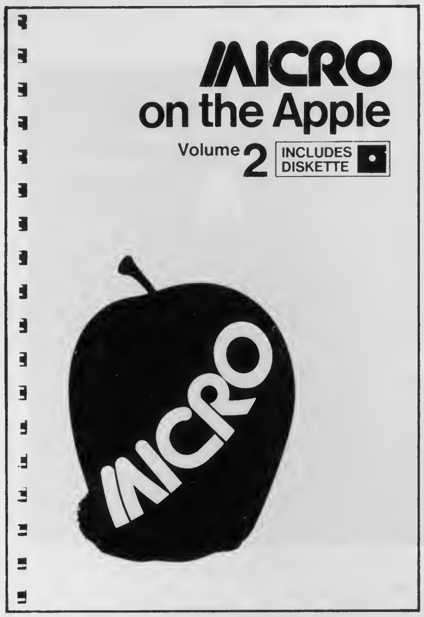

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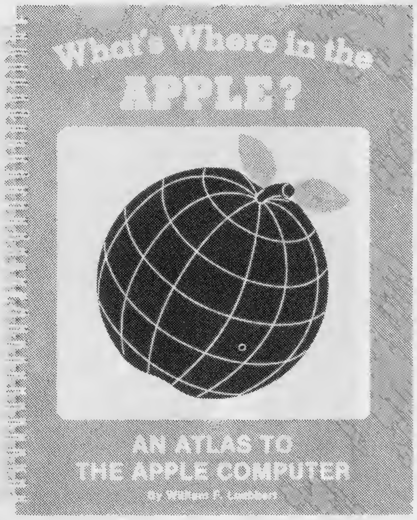

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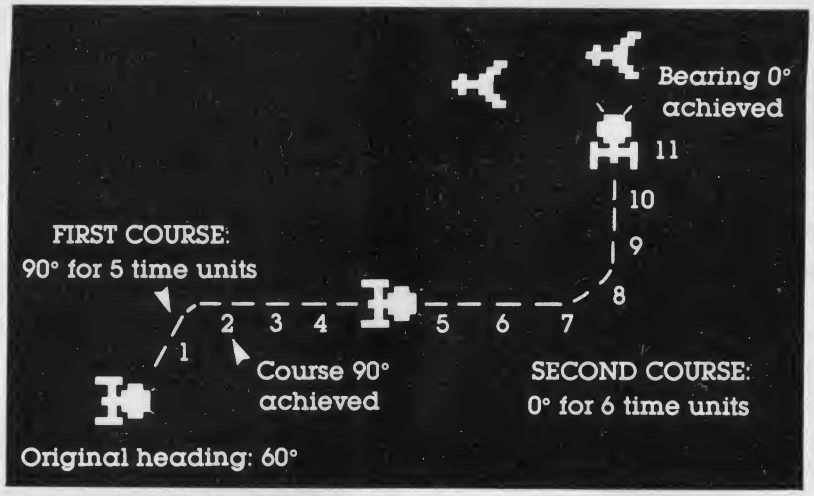
CIRCLE 170 ON READER SERVICE CARD

The Warp Factor

David Lubar



This Alliance cruiser needed two successive MS (move ship) commands to describe this S-curve. The first MS command turns the ship to bearing 90° for 5 time units. The second command alters course to 0° for six time units. At least one more MS commands would be required to complete the remaining 5 time units of the turn.

creative computing
SOFTWARE PROFILE

Name: The Warp Factor
Type: Space Fight Simulation
System: 48K Apple with Rom Applesoft, Disk Drive
Format: Disk
Language: Applesoft
Summary: Excellent strategy game
Price: $39.95
Manufacturer: Strategic Simulations
465 Fairchild Drive
Suite 108
Mountain View, CA
94043

The early programs from **Strategic Simulations** had a reputation for a long lag time between turns. In complex situations, there could be waits of half an hour or more while combat results were produced. Thus, when *The Warp Factor* arrived for review, I was hesitant to look at it myself. I just couldn't envision spending hours in space fights that didn't take place in real time. Luckily, I did take a look at the game. *Warp Factor* is great. Those of you who liked playing Star Trek, but got bored with the simplicity and redundacy of the game, have a new addiction in store.

Warp Factor places you in command of a starship or fleet of ships. You can be part of any of six interstellar nationalities; Alliance, Reman Marauder, Imperial Pirate, Klargon Empire, Independent Starbase or Freeman. Different nations have different ships at their command. Each ship has a specific type of armament and shields, as well as a different turning rate, acceleration, and mass. This is no simple aim-and-shoot simulation. The ship must be commanded with skill and intelligence, integrating all features and capabilities of the vessel into each decision.

Play proceeds in phases. After choosing a scenario, and getting your ship or ships, you go through a series of commands. Let's assume you are controlling an Alliance Heavy Cruiser. The first command, after checking the status of the ship is Set Display. The display can be centered either on the ship or at galactic coordinate 0,0. The view can be in any of eleven magnifications from a close-up minus 5 to a wide-angle plus 5. Once you see the location of the enemy, you can make battle plans. Energy is allocated to shields, weapons, transporters, electronic counter measures, and electronic counter counter measures. Certain weapons have to be charged for several turns before they can be fired. Each ship has six shields, which can be individually reinforced. During energy allocation, you also choose the speed of the ship for that turn.

The next key area is the Fire Weapons command. In this segment, you choose which weapons to fire in up to three separate salvos. For example, the Alliance Heavy Cruiser can fire three phasers and two torpedoes during the first salvo. Then it can fire its remaining phasers and torpedoes at a different target during the second salvo, and fire nothing during the third. For each salvo, you have a choice of firing according to range, time, or last moment. This is where skill truly enters the game. Let's say you are close to an enemy ship. You might have already completed a portion of your movement phase (more on that later) and noticed that you fly past the ship on time segment eight. Using the specific-time option of the Fire Weapons command, you could choose to fire all rear-facing weapons at time-segment eight. Most weapons have a limited field of aim, and it does no good to fire a weapon forward if the target ship is behind you. Some weapons hit (or miss) their targets in the turn they are fired, others, such as drones and plasma torpedoes, might travel for more than one turn before reaching their target.

The final crucial command area is Move Ship. Here, you can specify direction of movement for up to sixteen time segments. After any move, the position of the ship is replotted. You can move a part of the distance, see where you end up, then go to the Fire Weapons command. Your turn is over after the last move segment has been entered.

Then comes your opponent's turn. If you are playing another human, he will go through the same command series. If you are playing against the computer, it will take a minute or so to enter commands.

Next come the results. The computer will think about things for a minute or so. If there is combat, it will inform you and ask you to hit return. This is nice since it allows you to leave the room and not miss anything. Combat results are reported as text, and there might be a wait of several more minutes between segments of the report. But the wait never seemed unduly long.

I first tried the game with one ship against a computer ship. Next, to see how much longer the wait became, I played with four ships against four on the computer. Surprisingly, the wait didn't increase much.

There are five scenarios available, four of which are for one player. Most scenarios allow a choice of ships, thus greatly expanding play possibilities. Along with the disk, you also get a thirteen-page instruction manual, and a set of sheets illustrating and describing the available ships.

Warp Factor is excellent. A lot of thought, strategy, and planning is required if you want any chance to beat the computer. The control over the ship, and the many facets of navigation and combat, make the game extremely challenging. If you have a bit of patience and don't mind waiting a few minutes for results, and if you want to take part in a contest requiring plenty of thought and skill, *Warp Factor* is definitely worth buying. □

Ricochet from Automated Simulations

Add Bounce to Your Computer

Eric Wolcott

creative computing

SOFTWARE PROFILE

Name: Ricochet

Type: Strategy

System: 16K Atari, Level II
TRS-80 cassette, 32K Atari,
32K TRSDOS TRS-80,
48K Applesoft diskette

Language: Basic

Summary: Ricochet is a good, easily playable and enjoyable game.

Price: $19.95

Manufacturer:
Automated Simulations
P.O. Box 4247
Mountain View, CA 94040

Are you tired of arcade games? Are you looking for a different approach to a strategy game? If so, *Ricochet* is the game for you.

Played on a rectangular field covering the screen, *Ricochet* combines action and strategy for two players. Each player has two corner launchers with which to shoot balls. The object is to score points by bouncing the ball off of blockades and into your opponent's goals or launchers.

The blockades begin as vertical lines. When one is hit, it deflects the ball and flips to a horizontal position. If hit again, it reverts to vertical. In this way you can feint your opponent out of position.

You can play this game with a simple strategy and little forethought or plan every move and bounce in advance. *Ricochet* is subtle enough for a master and simple enough for a child.

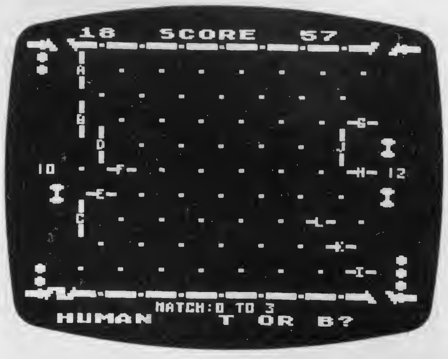
When the game begins, and at each turn, the player has a choice of either shooting a ball or moving some of his barricades. The way the board is designed, if the first player shoots right away, the ball will end up blocking his own launcher, giving his opponent points. So the first play always consists of a move. This move is limited to one direction, but as many blockades as the player wishes can be moved.

Once a ball is launched, it bounces against blockades and walls until it either goes off the left or right edge of the screen or lands in a launcher. When a ball enters a launcher, that launcher becomes inactive for several turns. If both launchers are blocked, or a player is unable to shoot for any other reason (such as running out of balls), the game is over.

At the end of a game, the winner receives one point for every ten points difference between the scores of the players. A match consists of three games, and it is in the second and third game where *Ricochet* shows intelligent touches.

The score of any previous game in a match affects the layout of the next board. If a player scores well, his opponent will be given higher scoring potential in the next game, and the player who did well will have fewer bumpers with lower score value to shoot for. This ensures a constantly-changing and fascinating game. At the end of a match, a player receives a rating, allowing the computer to adjust to his level of play.

Five game options provide a wide variety of skill levels. The four computer opponents are progressively tougher to beat. As your skill level increases, your computer opponent plans further ahead. And when you have mastered one game there are still four more different game options. I found that it was easy to find a game I could beat and very easy to find many I couldn't. The computer can always provide a challenge if a friend is not available.



```
        MATCH:0 TO 3
HUMAN        T  OR  B?
```

Ricochet is a good game. The things that make it good are the combination of graphics, sound, strategy, and action. The graphics and sound are state-of-the-art, hi-res graphics and well designed sounds. This is expected on the Atari machines because of the ease with which good graphics and sound can be accomplished. The strategy, and the action can be found in many other games (although usually separate and not mixed in the same game).

It is when they are carefully combined, as they are in *Ricochet* that you find a superior game. I enjoyed the game despite my normal preference for arcade style over strategy games. With its variable skill levels, great graphics and superb sound *Ricochet* by Automated Simulations is definitely a worthy addition to your program library. ☐

Hi-Res Soccer

JUST FOR KICKS

Dale Archibald

creative computing
SOFTWARE PROFILE

Name: Hi-Res Soccer
Type: Sports
System: 48K Apple II or II Plus and one disk drive, DOS 3.2 and 3.3
Format: Graphics
Language: Machine
Summary: Man meets machine and learns humility
Price: $29.95
Manufacturer:
On-Line Systems
36575 Mudge Ranch Rd.
Coarsegold, CA 93614

I never expected to see a computer game this good—at least not so soon. Designed by Jay Sullivan (who also designed Hi-Res Football for On-Line), this game is a screamer. Rather, it's a cusser, especially when one of the strikers sends the ball floating toward your net and you send the goalie in the wrong direction.

Sullivan has designed it so that each player controls the movements of eight soccer players with the game paddles. The angle of an arrow drawn on the paddle determines the direction in which a figure runs. So your figures are constantly scrambling across the screen. I should have such boundless energy.

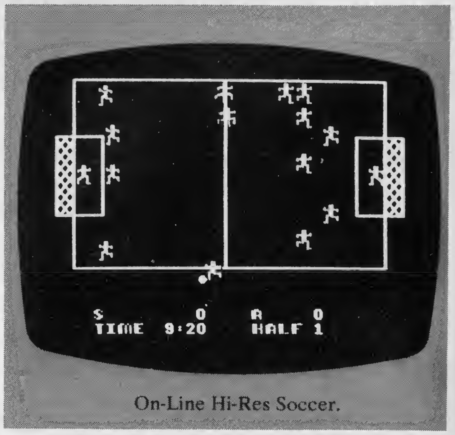
The player in the green jersey dribbled the ball down the field, deftly evading the rushes and lunges of his purple-clad opponents. At the last second, faking a kick to draw the goalie toward him, he passed the ball to a teammate who drove it between the bars for a score.

The player who has the ball dribbles it with his feet. The paddle setting also controls the direction of the kick—in one of 28 directions. With a little practice, you learn how to pass the ball back and forth between players; how to fake the goalie out; how to carom a pass into the goal off the sidelines in the beginner's game; where to have your goalie put a goal kick; and how to keep from being demolished by the Apple team in solitaire games.

To simulate balls being kicked into the air, some kicks can't be caught immediately: a rebound off the solitaire goalie delays one second, as does a throw-in when the ball is kicked out of bounds to the top or bottom (advanced game only). A corner kick occurs when a team kicks the ball out of bounds on the side of the field on which its goal is located; the opposing team gets to kick it in from the corner, with a two second delay. Finally, a goalie can kick with a two-and-a-half second delay if the opposing team kicks the ball out of bounds on his side.

There are three levels of play when two people play, one for solitaire play. At the beginner level, the ball bounces off all four sides of the field. For intermediates it bounces off the top and bottom but goes out of bounds to left and right, and in advanced play the ball can go out of bounds anywhere.

On color sets, the players are green and purple. On black and white, they're gray vs. black and white stripes.



```
S          0      A      0
TIME   9:20      HALF   1
```

On-Line Hi-Res Soccer.

It's hilarious to see the players run headlong across the field, steal the ball away from each other and intercept passes. The goalie even glides to catch the ball between his legs on attempted scores.

Don't expect to get the hang of it right away, either. I've been beaten by scores of 42 to 14, 24 to 6, etc. It took me several days of practice before I finally beat the game 5 to 3.

The game is divided into two halves of any length up to 45 minutes. The one bad thing about it is that there is no way to get a time-out to answer the telephone or any other call. □

Dale Archibald, 1817 Third Ave. N., Minneapolis, MN 55405.

Cyborg

David Lubar

One of the problems with Adventure games is that the player must communicate with a disembodied "thing." Is this thing the friendly home computer? Is it some spectral guide or fairy godmother? Who knows? Michael Berlyn, writer of the Adventure *Oo-topos* and a published author of science fiction, has done something about this problem. His solution comes in the form of a new Adventure called *Cyborg*. Among other strong points, *Cyborg* takes Adventures out of the puppet league. And it does that very well.

Cyborg takes Adventures out of the puppet league.

The premise of the game is that the player is a cyborg. This cybernetic organism is part human and part machine. The player communicates with his synthetic half, asks advice on situations and objects, requests scans of items, and in other ways depends on help from his high-tech add-on. Advice, descriptions, help... sounds like an Adventure format. But the player is no longer talking to (or at) some ethereal being. He is being aided by a crucial part of himself (you are not alone). This is an elegant leap in the concept of Adventure games. In essence Berlyn has done for intellectual appeal what Ken Williams did for visual appeal.

This leap alone, of course, is not enough to guarantee a good time. One concept does not make a game, and one good concept does not necessarily result in a great game. Fortunately, *Cyborg* maintains a high level of imagination and elegance. The scenario, the method of play, and the whole feel of the game revolve around the cybernetic concept. I hesitate to give specific examples as that might spoil the mystery and challenge the player faces. The following description is general, and does not contain any hints, peeks, or sneak previews.

creative computing

SOFTWARE PROFILE

Name: Cyborg

Type: Adventure

System: 48K Apple, Applesoft, Disk drive

Format: Disk

Language: Applesoft

Summary: A new wave for text Adventures

Price: $32.95

Manufacturer:
Sentient Software
P.O. Box 4929
Aspen, CO 81612

When the game begins, the player is on a path bordered by a forest. He is informed that he is damaged and that the situation must be taken care of before he loses too much power. The mechanics of the game are the same as those found in most Adventures: two-word commands are used, scenes are described in text, and movement is in terms of compass directions.

At one point in the game, there is a graphic animated sequence, a mini-game of skill and coordination that the player must master. When the player reaches this portion, he should definitely save the game before proceeding. The animated sequence is a guaranteed killer the first time around, partly because of the difficulty of the task, mostly because a few attempts are needed before the player becomes fully acquainted with the mechanics of this portion.

The saving process takes about seventeen seconds. While this might be a long wait for those who are used to instant computer response, it is definitely a time saver when compared to starting fresh. And there are a lot of ways to get killed in *Cyborg*. In some cases, the program allows the player to continue after returning him to a central point. In these cases the player loses any items he may have acquired.

There are two aspects of the game that are slightly annoying. Since it is in Basic, the player must, at times, wait for a response to his input. Also, whenever the player moves to a new location, the disk is accessed. Though this allows for a larger scenario and longer descriptions, it also increases the wait. So *Cyborg* doesn't give the player instantaneous response, but it does offer him a challenging game.

The animated sequence is a guaranteed killer the first time around.

Challenging? Nearly impossible for the novice, hard for those who are only marginally familiar with Adventures, and potentially tough for those who go through Adventures the way beer drinkers go through pretzels. As with most Adventures, it is linear. Without object A you can't get to location B. In *Cyborg*, object A can be pretty tough to obtain. A solution that seems obvious to one player may never occur to another. This is not a complaint, just a warning to those who are still lost in *Adventureland*. Very few people will get through this game in one sitting.

I really can't say more without giving out hints. It should suffice to say that *Cyborg* is imaginative, tough, and a welcome addition to the world of text Adventures. I can't wait to see what leap in imagination Mr. Berlyn offers next. ☐

Fantasy Games

David Lubar

New fantasy games are being produced at such a rate that if you were to line them up and march them through a computer one at a time, the line would never end. This presents a problem for the games addict with limited wealth, and for the reviewer with limited time. Some late sessions, killing dragons while the sun rose somewhere in the real world, solved the temporal problem. The financial problem can be eased by avoiding games that don't suit your tastes or fail to give you your money's worth.

The phrase "fantasy games" is a catch-all designed to encompass adventures, dungeons and dragons, role-playing games, and anything else of similar bent. Some of the programs come in versions for TRS-80, Apple and PET, others are only available for one computer. The settings range from castles and dungeons to outer space and strange islands, with interaction that ranges from sentences to single-letter commands.

Apshai and Others

The first campaign of this review will be through the deadly labrynths created by **Automated Simulations**. The games, with such exotic titles as *Temple of Apshai* and *The Datestones of Ryn* are all similar in basic format. The player moves through a series of rooms, gaining experience and treasures while fighting monsters. Throughout the game, fatigue and wound levels are displayed. If your fatigue gets too great, you can't fight or move. If the wounds hit bottom, you're finished (though ressurection plays a part in several of the programs).

The combat portion is nicely conceived. The player's character can attack, thrust, parry, or fire an arrow. But he has to be facing the opponent. This involves some quick moves and quick thinking, especially since you only have a certain amount of time to make any move. The monsters don't wait while you try to remember the command for turning around. There are two slight weaknesses in this combat portion. First, you have no indication of the status of the attacker. Since his wounds and fatigue aren't displayed, you don't know whether he is full of fight or at death's door. Thus you could waste a precious magic arrow on a monster that could easily be felled with a simple sword stroke. Also, a new command is held while the present move takes place. For example, while one attack is in progress, you can hit the key which fires an arrow. If the attack resulted in the death of the monster, the arrow will still be fired. This can be slightly annoying when you are running low on arrows.

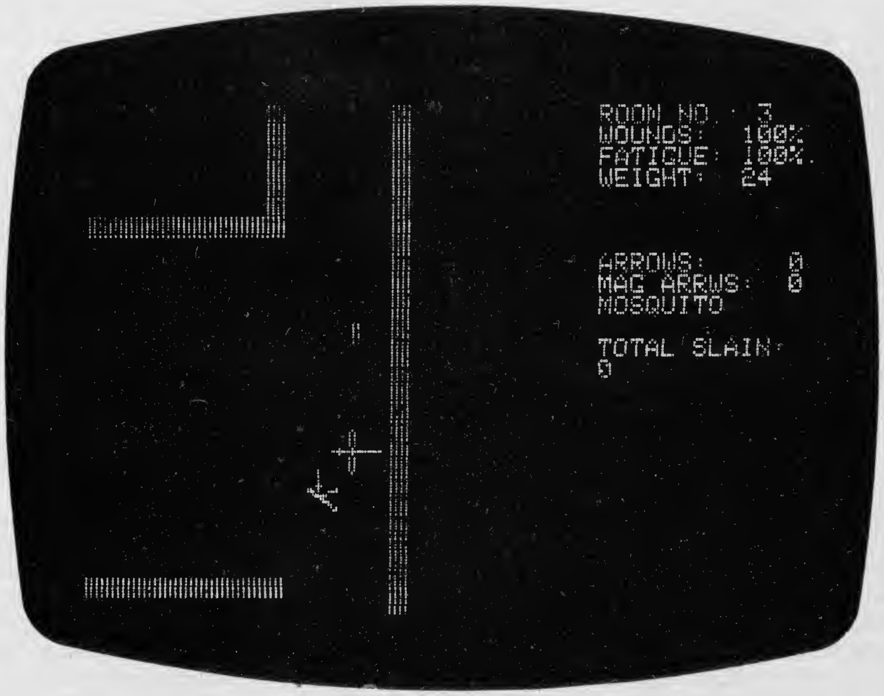
The real-time aspect of the game presents a challenge to the new player. While you are looking through the manual for a command, room description, or treasure description, a skeleton might be hacking you to pieces. A few hours of play are sufficient to become familiar with the commands and treasures. After that, you can give full attention to the vampire bat or animated armor which is coming in for the kill.

The games vary mostly in purpose and treasures. *Temple of Apshai* is a four level dungeon. You wander, building characteristics and attempting to gather all twenty treasures. Whenever you leave the dungeon, the innkeeper can give you a list of collected treasures, and also sell you weapons, armor, and healing salves. The program does not keep track of a player's money. You have to look up the values of your treasures, then tell the inn keeper how much silver you have. Those who like to cheat at solitaire can make use of this to add a bit of unearned wealth to their character's coffers.

Morloc's Tower is designed to be an easier game. Here, the goal is to kill Morlock. The catch is that you have to find him first. On the way, you gather treasures, some of which are aids, some of which are designed to increase the mortality rate.

Datestones of Ryn is also designed for beginners, though pros will find some challenge here. The play field this time is a cavern with corridors and rooms. Hidden within are datestones. Each stone that is brought out of the cave earns you some points. Here, you are fighting not just monsters, but time itself. You only have twenty minutes.

Rescue at Rigel moves from fantasy to science fiction. Your sword and bow are replaced by blasters and other futuristic weapons. The treasures are now human captives which you must find and beam



```
ROOM NO : 3
WOUNDS:  100%
FATIGUE: 100%.
WEIGHT:  24


ARROWS:      0
MAG ARRWS:   0
MOSQUITO

TOTAL SLAIN:
0
```

The hero fights a giant mosquito in a corridor of Apshai.

to safety. The multi-leveled alien ship has drop shafts, lift shafts, and teleport doors that make mapping a challenge.

Hellfire Warrior, the sequel to *Temple of Apshai*, extends the game potential greatly, adding new twists and improving some of the parts of play. For a closer look, see Dale Archibald's article, "Hellfire, Brimstone, and Fun," elsewhere in this issue.

A typical segment of play, using *Temple of Apshai* as an example, might run as follows. Your character, armed with a short sword, shield, and chain mail, has just left the inn and finds himself in a large room. There is a doorway to the East. After an unsuccessful search for secret doors, he moves forward. A treasure sits in the middle of the room. Before he can reach it, a giant rat attacks. The player sees he is out of line with the rat. Turning left, he moves up a few steps, then turns back and fires. The arrow strikes, but the rat keeps coming. Switching tactics, the player thrusts. The weakened rat strikes back, then succumbs to the wounds, leaving the adventurer to claim the treasure. He was slightly injured in the encounter, but doesn't yet want to use one of the few healing potions he managed to purchase. With a bit of experience under his belt, the brave fellow moves farther from the security of the exit, alert now for the next attack.

In design, concept, graphics, and entertainment, the games are good. The die-hard game player would probably want to own all of them. The person with only a mild interest in this area might find them too similar. Those who lie between these extremes would probably enjoy owning two or three of the games.

Now for prices and configurations. Note that all TRS-80 cassettes require a 16K Level II Model I system, TRS-80 disk versions need a 32K computer with TRSDOS, Apple versions on cassette require 32K and ROM Applesoft, Apple disk versions need 48K and ROM Applesoft. *The Datestones of Ryn*, at $19.95, is available on cassette for a TRS-80, Apple, or 16K PET. The disk version (same price) is available for a TRS-80 or Apple. *Morloc's Tower* ($19.95) comes on cassette for a TRS-80, Apple, or 24K PET. *Rescue at Rigel* ($29.95) is on cassette for the TRS-80, Apple, or 16K PET, with disk versions for the TRS-80 and Apple. *The Temple of Apshai* and *Hellfire Warrior* ($39.95 each) are on cassette for the TRS-80 or 32K PET, and on disk for the TRS-80 or Apple. **Automated Simulations** can be found at P.O. Box 4247, 1988 Leghorn St., Mountain View CA 94040. (Please add $1 for p&h, or they'll send a dragon to your doorstep.)

I Am Not a Number

If the above phrase brings a touch of nostalgia to your heart, you'll love **Edu-Ware's** psychological adventure set on an island prison. Based on the TV show, *The Prisoner*, this $29.95 disk for a 48K Apple with ROM Applesoft gives you a chance to escape from the island. For those who missed the series, it was a surreal story of a secret agent who had decided to resign from the service. Soon after posting his resignation, he found himself on a strange island populated by fellow inmates and members of the island hierarchy. During each episode, he tried to maintain his sanity and identity while trying to escape.

The program places you on an island with twenty rooms. You are given a special resignation code. If you reveal it, you lose. Each room on the island is a sort of mini-adventure. Usually there is more to discover than meets the eye. Some secrets are kept from you until you make the right move or acquire the necessary objects. While movement is accomplished though single-key commands, sections of the program allow full dialog between the player and the computer. The first room is a simple maze, though the walls aren't revealed until you bump into them. If you make certain mistakes, you get sent back to this room. After repeated trips, the maze becomes tedious, but this is good incentive not to make mistakes.

A full description of any of the rooms would spoil the fun, so they won't be discussed in detail. They include the hospital, library, diner, newsstand, and other facilities of the island. According to the instructions, the program makes use of devious psychological techniques such as subliminal messages. There is also a scoring system based on your ability to avoid conformity and submission. While it's nice to get a good score, your main goal is to escape. The game can be suspended at any point. When you return, you will start in the first room, but your score will be maintained, as will any possessions you have acquired.

A short segment of play might run this way. The Prisoner has left his room and is exploring the island. He wanders into a newsstand for a paper, then stops at the diner for some food. He tries to get into the library, but isn't admitted because he has no book to contribute. His next move puts him in the courthouse. The prosecutor speaks, then gives the Prisoner a chance to reply. He begins to type. At each keystroke, something is added to the picture on the screen. He pauses to think, then realizes the game his captors are playing. His next response proves his guess to be correct, but it is too late. He loses the game and is returned to the first room.

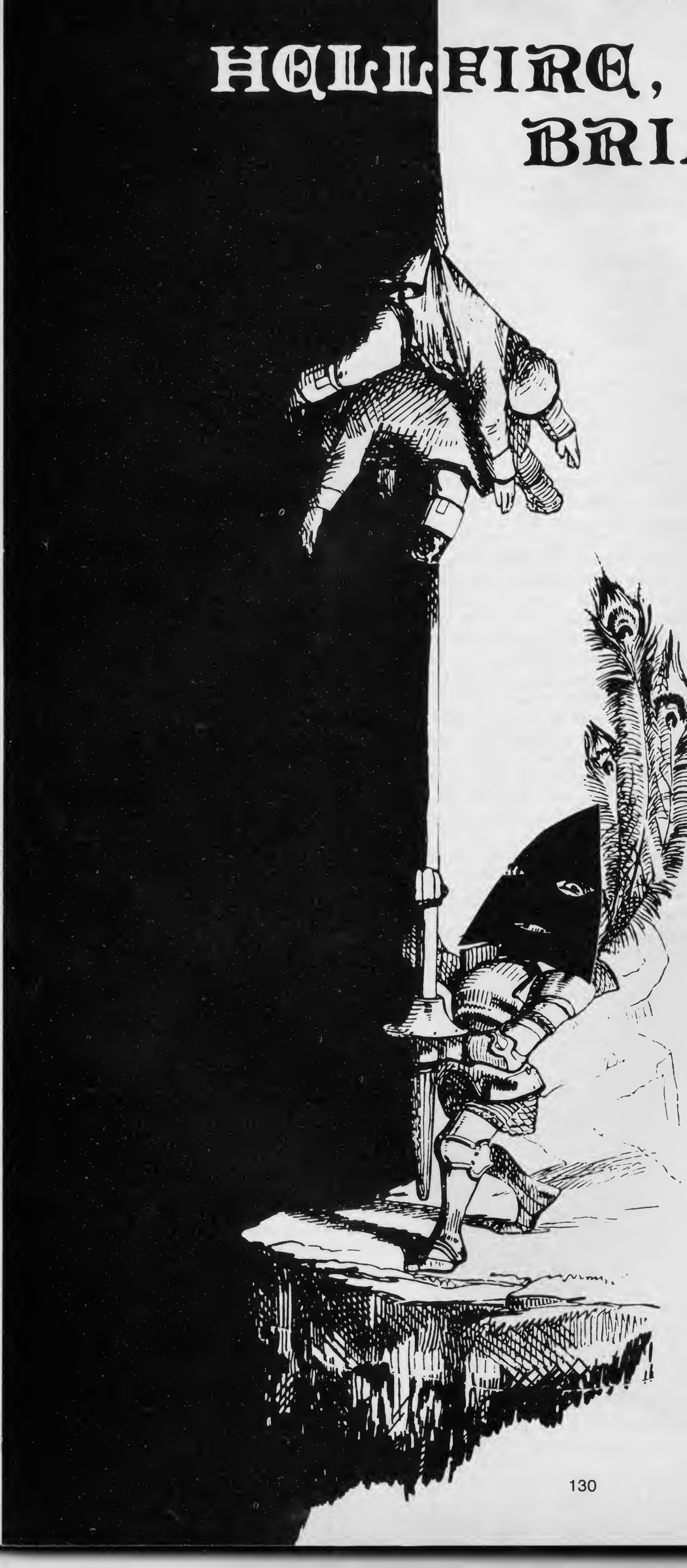
The island can be reached by way of **Edu-Ware Services, Inc.**, 22035 Burbank **223, Woodland Hills CA 91367.**

Almost Heaven

Avalon Hill, a leader in the field of war games, has expanded into the software market with half a dozen products, including a fantasy trip through the kingdom of Golconda. *Lords of Karma* ($20.00 plus $2.00 p&h) is sold as a single cassette containing 48K TRS-80, 32K PET, and 32K Apple versions of the program. The object of the game is to get to Heaven with as many Karma points as possible. These points are gained through acts of kindness, such as giving money to beggars, and acts of bravery, such as killing a giant spider. The display is straight text. You use the standard type of two-word commands, with single-letter entry for movements.

The program is large, and contains a lot of different locations, varying from underground mazes to open forest. After loading the machine-language tape, there is a wait of several minutes on the Apple and PET versions while the "board" is being set up. If you want to take a break, you can save the whole program back to tape, or save just the data. The instructions contain all the information necessary for doing this. The design of the program does have one flaw. When the game ends, you can't just run it again since the data contains an end-of-game condition. Instead, you have to go through the whole loading procedure again. The length of the game varies greatly between plays. One time, I was zapped to Heaven with only 11 Karma points. Another time, I was up to 270 points with no sign of salvation. After a while, I found myself avoiding anything that might increase my Karma and end the game before I had explored all the tricks and traps of Golconda. A typical portion of play might run like this. You find yourself in the central square of Golconda. Hitting "L" for "LOOK" you are told what can be seen in all directions. Picking up a coin from the ground, you move north, passing through a gate into a narrow valley. You meet a beggar and give him the coin. Your Karma goes up. Moving off the path into the woods, you encounter a ruffian with a young woman. While attempting to speak with him, he stabs you. You are reborn on a mountain top, and must descend to the world below since you don't have enough Karma to go to heaven. For further enlightenment, contact **The Avalon Hill Game Company**, 4517 Harford Road, Baltimore MD 21214. □

HELLFIRE, BRIMSTONE & FUN



Dale Archibald

For those of you who may have spent the last few years cloistered on some desert island, one of the hottest categories in computer games is the adventure.

Adventures arrive in all-text, text and pictures, and mostly pictures with a little text as a scoreboard. They take place in caves, in dungeons, in space, aboard ships or in haunted houses . . . anywhere a courageous soul might intrude.

The Temple of Apshai is a popular game published by Automated Simulations, P.O. Box 4247, Mountain View, CA 94040 some time back. It allows the player to control a continuing character as he or she traces the 200+ rooms spread over four levels in the demolished caverns of Apshai. The Temple was dedicated to the worship of insect gods, mainly giant ones. The adventure lies in mapping the levels, gathering treasures, and battling monsters. The effort goes for naught, of course, if you're killed. Treasures can be silver or jewels, or magic items; greater abilities are realized as experience points earned by killing monsters accumulate.

It is fascinating to watch an antman come swaggering down the corridor after your heroine or hero. Fire an arrow. Watch it fly and hit — or miss — the target. Grapple, and thrust, attack, or parry. You see the movement and struggle, and have direct control over the actions of your character. That means you control every action of your character, from the type of sword attack to how fast to run. You don't have a set menu of things you can do. In addition, you can use that character in every onslaught, name it, buy better weapons and armor, etc. These are two of the nicest features of the game.

Hellfire Warrior is Automated Simulations challenging sequel to *Temple of Apshai.* The formats are the same, yet the many new features give this game a different feel. The graphics are superior. There is more magical equipment and special effects. In effect, *Warrior* takes up where *Temple* leaves off.

Level five is The Lower Reaches of Apshai and musters similar giant insectoids.

Level six is Daedalus' labyrinth replete with minotaurs and other crossbred bullheaded beasts. Your character is dropped in the center of the maze, and to survive has to find the secret way out.

Dale Archibald, 1817 Third Ave. N, Minneapolis, MN 55405.

Level seven offers assorted Undead: The tame skeleton of Apshai is tougher here and armed with two swords!

The warrior is on a quest to free the battle-maid Brynhild, enchanted in a ring of fire, from the lowest level of the dungeon: Hell. It is a more attractive game than *Temple* because it has this goal. You aren't forced to play for blood and plunder alone.

There are also elements of mystery in the game: certain treasures found on other levels come to their true potential in Hell. It's up to the player to divine how they must be used.

Unexpected humor enriches it. For example: by the time *Hellfire* begins, the ruins of the Temple have become so popular with adventurers a booming tourist industry has been founded. I was disappointed though when my wife's warrior-woman was hailed as "fellow" and "sirrah." *Temple* isn't sexist in that way. The instruction book attempts to make amends, I must point out.

Players can bargain for arms and armor in Gulik's shop, then take them to the Mage, Malaclypse, to be enchanted. (In addition to the arrows and magic arrows a character may fire in *Temple, Warrior* offers a blowgun and javelins as distance weapons. I think these may prove very valuable on the plains of Hell.)

Malaclypse is a particularly impatient and irritable wizard. Ignore this irascibility and you will get him down to your price. Malaclypse enchants arms and armor, plus sells a variety of magic talismans. Unfortunately, their function is not revealed. (Sometimes seven-league boots are in stock. These provide the special effect of doubling the distance traveled per move. The boots seem a novelty but are essential in the vast lower levels.)

You'll gaze long at the tantalizing potions Fnord the Apothecary purveys. Here are found such delicacies as Falcon Milk, Kraken Blood, Ambrosia, and many others. Alas, this is before the onslaught of the FDA; the effects of these draughts can be learned only by trial and error, as with the talismans. (I recommend the Oliphant Milk.) Note that none of these aids comes cheap!

It is not as easy to get rich in *Warrior* as in the *Temple*. The unit of exchange in *Temple* is the silver piece. *Hellfire Warrior* is on the gold standard. My character's bank account is in confusion as he flits back and forth between *Temple* and *Warrior*. Inflation has hit. I did not believe my eyes when *Taxes* were assessed on a rich treasure!

I have seen little of Hell, the eighth level. The warrior-woman my wife has used for months was tragically killed and eaten recently. (R.I.P. Andromeda, 500,000+ experience points). Her replacement must gain more experience before she can enter the lowest levels. My characters get chopped into catsmeat before they get past the first room. I have to be more patient.

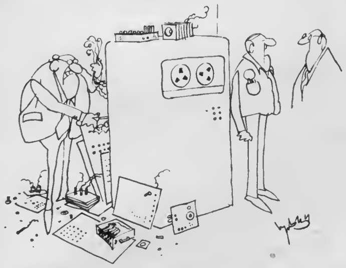
Luckily, experience can be won faster in *Warrior* than in the *Temple*. Nothing in level five can kill a character as fast as those level four antmen (may their mandibles fall out!)

Two features *Warrior* offers that *Temple* doesn't are the abilities to save a game in progress, and to save a character. Unfortunately, I haven't been able to save a game in progress yet. It won't work with this disk, but I don't mind; I hate to give it up long enough to get a replacement.

The instruction manual claims "Owners of some versions may also save a character or a level after the character exits the dunjon . . . "? I don't know why this isn't available on all versions. The game asks if I want to save the information each time my character leaves a level, yet it doesn't save. So if the machine's turned off, or used for something else, that level is stocked with a fresh supply of monsters (and treasures) next time a character ventures in.

The book is as well-written and illustrated as its predecessor, with clear instructions and fine descriptions of the foe, from behemoths to zombies, that inhabit the corridors and plains. It also describes most of the treasures, and all the surrounds. A separate card contains short prompts of the various commands available.

All-in-all, *Warrior* is a fine game, one any true adventurer would be proud to own. It's available on disk for the 32K TRS-80, and 48K Apple with Applesoft in ROM for $39.95; on cassette for the TRS-80 16K Level II and Commodore PET, 32K, for $39.95. Add it to your treasure chest. ☐



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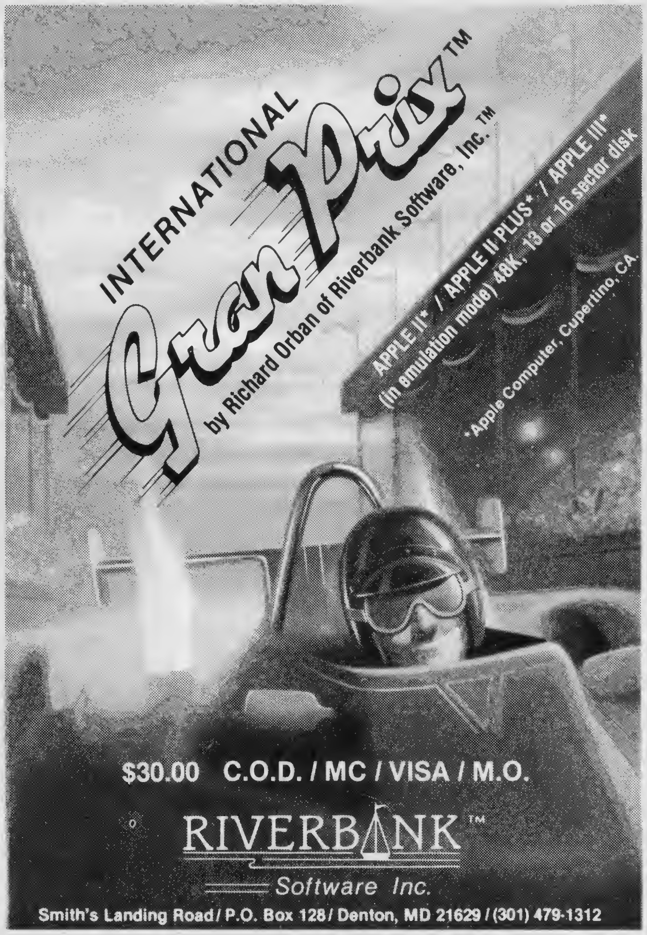

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CIRCLE 172 ON READER SERVICE CARD

New Games for the Apple

David Lubar

Among the software to cross this desk recently are several new games for the Apple II. They are all worth covering, though each might appeal to a different section of the Apple community.

A Shoe in the Works

On-Line Systems has done it again with *Sabotage*, a highly captivating game that will put blisters on anyone's paddle finger. The player has a small cannon at the bottom of the screen. Aiming and firing can be controlled either through a paddle or the keyboard. The player attempts to defend his cannon against helicopters that drop parachutists, and against planes that drop bombs. If enough saboteurs reach the ground, they destroy the cannon in a very amusing manner. If a bomb lands, the cannon is blown to pieces. The player has the option of using steerable shells which curve as the cannon is rotated. With paddle control, a stream of shells can be fired by holding the button down.

If the game sounds too easy, add the fact that each shot costs a point. The player can hose the helicopters with a stream of shells, but that strategy won't contribute much to his score. Once saboteurs reach the ground, they can't be shot. But there is a way to get rid of them. If the parachute is shot away from an attacker in the air, he will fall to the ground with a splat. A saboteur unfortunate enough to be beneath the plummetting paratrooper will be eradicated. The game starts out at an easy pace with just one or two helicopters on the screen at any time. After a while, the planes appear. When the helicopters return, they drop more saboteurs. The shrapnel from struck helicopters can wipe out other helicopters or paratroopers, and it's possible, in this way, to get two or three helicopters with one shot.

The game keeps track of high score during individual runs, but doesn't store the high score on disk. *Sabotage* is a very good game with fine graphics and high replayability.

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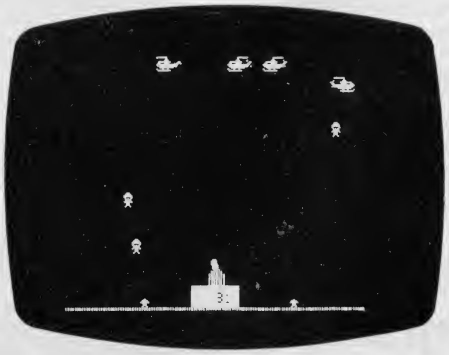
SOFTWARE PROFILE
Name: Sabotage
Type: Arcade Game
System: 48K Apple, Disk Drive
Format: Disk
Language: Machine Language
Summary: Excellent game
Price: $24.95
Manufacturer:
On-Line Systems
36575 Mudge Ranch Rd.
Coarsegold, CA 93644



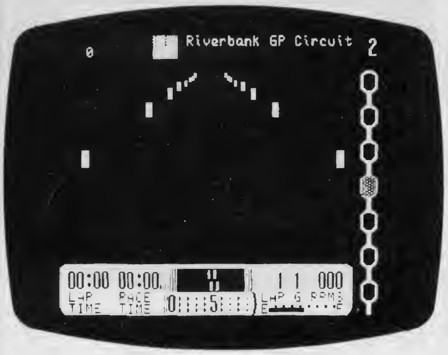
Sabotage.

On the Circuit

International Gran Prix Racing is everything an Apple game should be, and more. Written by Richard Orban, who created *Three Mile Island*, it is one of the few driving games that successfully solves the paddle problem. Namely, how can a player shift, accelerate, decelerate, and steer without getting hopelessly tangled in a jumble of paddles and keys? The solution in *Gran Prix* is absolutely elegant. The player uses only one paddle. The paddle controls steering. If the button is held, the car accelerates. If the button is quickly released and pressed, the car will shift to the next gear, assuming high enough engine revs have been reached. Releasing the button causes the car to decelerate. During deceleration, a press and release of the button is used for downshifting. If the player desires, he can switch to automatic transmission. There is even a cruise control.

creative computing
SOFTWARE PROFILE
Name: International Gran Prix
Type: Road race game
System: 48K Apple, Disk Drive, Paddles
Format: Disk
Language: Machine Language
Summary: Best road race on the market
Price: $30
Manufacturer:
Riverbank Software, Inc.
Smith's Landing Road
P.O. Box 128
Denton, MD 21629

All this merely scratches the surface of an excellent game. The program is basically a road race game, similar to the arcade game *280-ZAP*, where the screen displays roadposts flashing by the car. The icing on the cake comes in the form of five Gran Prix courses. At the start of the game, the player selects a course, then chooses the number of laps he wants to drive (from 1 to 10). Next, the amount of fuel is selected, followed by the skill level.



International Gran Prix.

There are eight levels. At the easiest, the car barely drifts; in middle levels, it skids; at the top level, the road turns to Teflon.

The dashboard display includes speedometer, tachometer, a timer for current lap and total time, and indicators showing the relation of the tires to the posts. Whenever the car moves dangerously close to the posts, a clicking warns the driver. Collisions are accompanied by a weird sound that seems to defy the limitations of the Apple speaker. The player's best lap time and total time for any course and skill level are stored and displayed by the game. All the curves have names, and these names are displayed on the screen when the car approaches.

Beyond great graphics and superb design, the game also simulates driving with nearly total realism. Whatever algorithms the author used, he did a good job. The car handles very accurately. It can accelerate through curves, go into controlled skids, and fishtale if the player oversteers. *Gran Prix* is a winner.

That Familiar Glow

Fighting its way through the plethora of Missile Command clones, *Norad*, from Western MicroData, emerges as a new twist on the theme. The player has a hi-res map of the good old USA, dotted with ten cities and ten missile bases. Each base has a number. Press that number on the keyboard and a missile leaves the base. The arrow keys control the horizontal motion of the missile. The space bar detonates the missile. If it is detonated close to an incoming warhead, all is well. If not, the warhead hits a city or a base. Cities hit twice are destroyed. Bases are wiped out with one hit. At intervals throughout the game, the cities are rebuilt, and any eradicated bases near a surviving city are replaced. The surviving cities also stock the silos with extra missiles. Silos start with ten missiles. The player receives bonus points for unused missiles.

creative computing
SOFTWARE PROFILE

Name: Norad

Type: Arcade Game

System: 48K Apple, Disk Drive

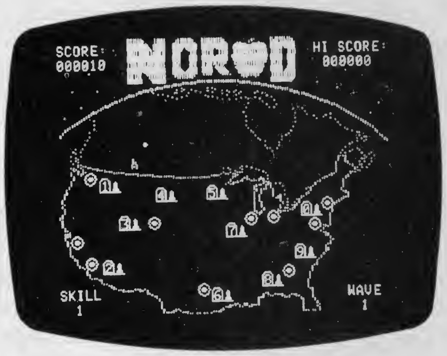
Format: Disk

Language: Machine Language

Summary: Defend the U.S.A. against missiles

Price: $29.95

Manufacturer:
Western MicroData
Enterprises, Ltd.
P.O. Box G33,
Postal Station G
Calgary, Alberta, Canada T3A 2G1



Norad.

There are three skill levels. Higher levels start with faster attacks, and throw more waves of attack at the player. On each level, the player wins if he survives a specific number of waves. At a certain point, the player is also given an MX missile site which can be moved across the map. The lowest skill level is good for learning the game. The highest level is very tough.

Raiders of the Lost Star

Strongly resembling a certain Atari classic, *Space Raiders* is a search-and-destroy game. Using a joystick or keys, the player moves through galactic quadrants, blasting enemy ships. The strong point of the game is the motion of the stars. The field moves toward the player and shifts realistically when he turns. The question is whether to compare it to the Atari version, or to view it as a game in itself. By comparison, it just doesn't offer the same graphics or sound. What works for the Atari won't necessarily work on the Apple, and vice versa. As a game, it is interesting, but rather repetitive. Only one ship attacks at a time. Basically, the player goes into a sector, destroys all the enemy ships, goes into the next sector, and so on. The player can also dock at a starbase when he needs more energy. The target has to be in the center of the crosshairs to be hit, adding a bit of difficulty to the game. If Atari Star Raiders appeals to you, this is as good a version as is likely to be produced for the Apple.

creative computing
SOFTWARE PROFILE

Name: Space Raiders

Type: Space Fight

System: 48K Apple, Disk Drive

Format: Disk

Language: Machine Language

Summary: Apple version of Star Raiders

Price: $29.95

Manufacturer:
United Software of America
750 3rd Ave.
New York, NY 10017

Treking On

Rainbow has made improvements to *A Stellar Trek* (reviewed Oct., 1980), producing *Super Stellar Trek*. The game offers a hi-res, real-time fight against Klingons and other baddies. The most obvious improvement is the elimination of constant disk access. In the original version, the program went to the disk after every command. Now, the routines remain in RAM, speeding up play and lowering disk wear. The first time a user plays the game, he is asked to name all the officers. From then on, this information is used to add color to the game, with reports coming to the bridge from the officers.

creative computing
SOFTWARE PROFILE

Name: Super Stellar Trek

Type: Spacefight simulation

System: 48K Apple, Applesoft, Disk Drive

Format: Disk

Language: Basic

Summary: Good Trek game

Price: $39.95

Manufacturer:
Rainbow Computing, Inc.
9719 Reseda Blvd.
Northridge, CA 91324

Overall play is in the basic StarTrek format; the player has a limited amount of time in which to find and destroy the Klingons, using photon torpedos and phasers. Extensive commands are available for such exotic actions as mining dilithium crystals. Those who enjoy Trek games will like this one.

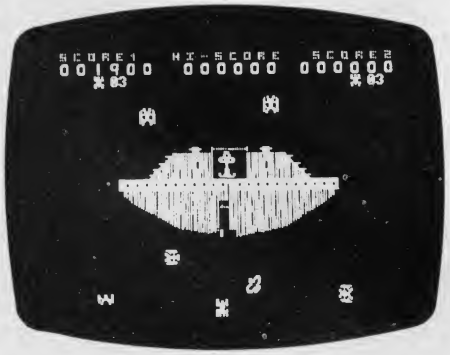
Apple Games, continued...

Ashes to Apples

An arcade game dealing with a certain mythical bird has found its way to the Apple in the form of *Falcons*. The game seems fairly easy for the first ten seconds or so. Several rows of ships move above the player, firing down at his base. This part is reminiscent of Invaders. Then a few ships break formation and swoop down. Now it seems a bit like Galaxian. The similarity vanishes as the attacking ships begin to fly in strange patterns, moving below the screen and attacking the player from below. A transformation suddenly occurs. The ship changes to a falcon and flies evasive patterns. It's worth more points now, but harder to hit. If the player clears the field, he gets another with a different formation. After this second field is cleared, the hard part begins. Small blue dots appear on the screen, weaving back and forth. They start to grow, becoming large dots, then huge falcons. They swoop at the player, moving at high speed. If hit straight on, the falcon is destroyed. If only winged, it returns. If the player gets through this field without losing his allotment of three ships, he gets a second field of dots that grow into falcons. Survivors are given a chance to destroy the mother ship. Make that MOTHER SHIP. The thing is huge. To destroy it, the player first has to blast a hole through the bottom. Next, a hole has to be made in a revolving rim. Once there is a clear path for a shot to the inside, the ship can be destroyed. But the mother ship shoots back. And groups of small ships hover above it, swooping down on the player. If the player destroys the mother ship, the game cycles back through the five levels again.

creative computing
SOFTWARE PROFILE

Name: Falcons
Type: Arcade Game
System: 48K Apple II or Apple III, Disk Drive
Format: Disk
Language: Machine Language
Summary: Superb and challenging game
Price: $29.95
Manufacturer:
Picadilly Software
89 Summit Ave.
Summit, NJ 07901



Attacking the mother ship in Falcons.

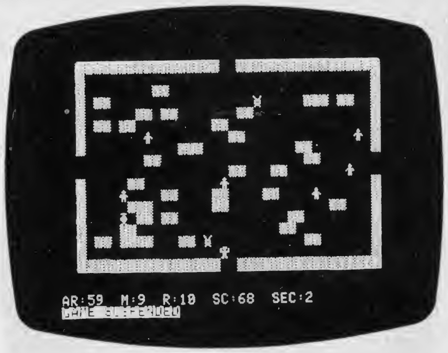
Beside firing, the player has the option of using shields. A shield lasts for about four seconds, then can't be used again for about five seconds. Shields are great for destroying swooping falcons since the birds are killed on contact with the force field. The game can be played with keys, paddles, or a joystick. There was one rough edge noticeable when fighting the mother ship. Occasionally, one of the attackers wouldn't be entirely erased from the screen when destroyed. But this barely detracts from the appeal of the game. *Falcons* is tough, fun and very well done.

Killer Robots, Drones, and Low-Life Storm Troopers

Mission Escape arrived here two days ago and has already taken control of the staff. They've been lining up to play this one. It is a cross between the arcade game, *Berzerk*, and some high-adrenalin contest that might be though of as death chess. The player starts at one of four doors to a room containing robots, drones, and storm troopers. His object is to get to the specified exit, and thus, to the next level. The storm troopers fire lasers that do damage to the player's armor. The drones also fire lasers but, if shot, explode with enough force to destroy anything adjacent to them. The robots fire missiles that always kill with on shot. Against this arsenal, the player has three weapons. He can fire a laser, fire a burst of three laser shots, or fire a missile. The missiles and rapid-fire bursts are limited, single laser shots are unlimited.

creative computing
SOFTWARE PROFILE

Name: Mission Escape
Type: Strategy and Action Game
System: 48K Apple, Applesoft, Disk Drive
Format: Disk
Language: Machine Language
Summary: Highly replayable game
Price: $24.95
Manufacturer:
CE Software
801 73rd. St.
Des Moines, IA 50312



Mission Escape.

The player and the enemy alternate turns. The player has ten seconds to issue up to three orders. Movement and firing are controlled from the keyboard. While some keyboard-controlled games are unexciting, *Mission Escape* is definitely not dull. Despite the alternation of turns, there is a real-time feel to it. As an extra touch, the top five scores are kept on the disk. *Mission Escape* is highly recommended.

It Isn't Raining Rain

Finally, in an attempt to make up for not reviewing it sooner, one more game deserves mention in this roundup. *Alien Rain* pits the player against a swarm of hovering, swooping attackers. They start out placidly enough, just moving back and forth across the top of the screen, letting the player pick them off with his ship. Then one or more of the critters comes swooping down, flying a drunken path and raining missiles. Attackers that make it to the bottom wrap around to rejoin the formation at the top. There are two flagships that are worth bonus points if shot while swooping. If the player clears the board, he gets another screenful. If he scores 3000 points, he gets an extra ship.

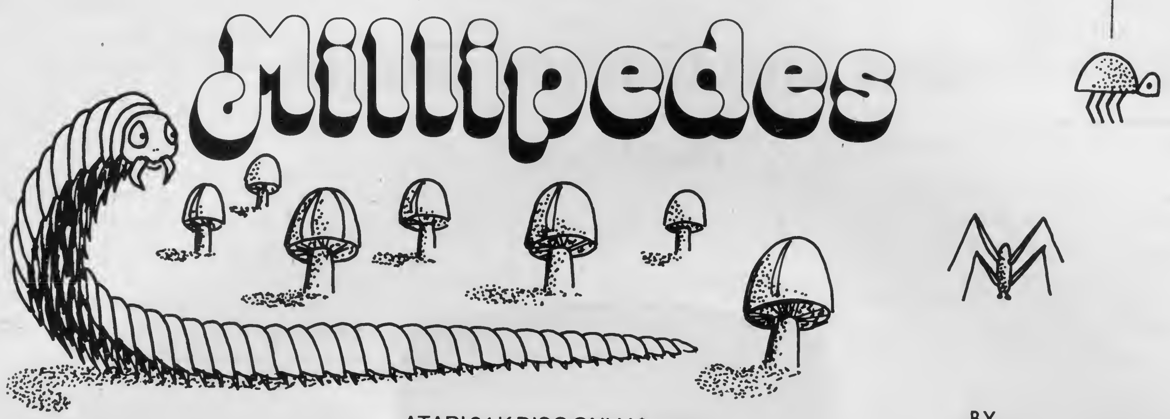
creative computing
SOFTWARE PROFILE

Name: Alien Rain
Type: Arcade Game
System: 48K Apple, Disk Drive
Format: Disk
Language: Basic
Summary: Tough and fast moving
Price: $24.95
Manufacturer:
Broderbund Software
2 Vista Wood Way
San Rafael, CA 94901

The animation here is very smooth, and the game is tough enough for most players. For those who have it mastered, Broderbund also offers *Alien Typhoon* with more aliens and faster action. ☐

SOFTWARE STREET

PRESENTS



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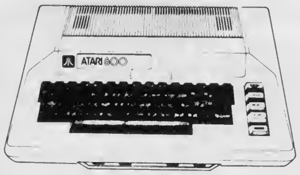

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Let the Games Begin

David Lubar

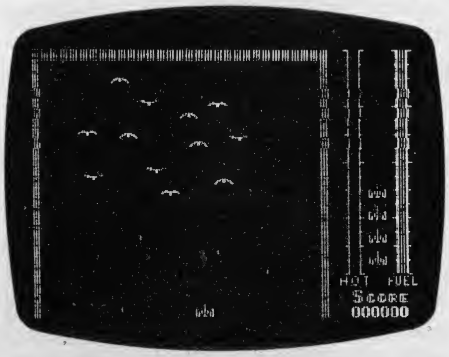
Apple games are proliferating at an astounding rate. The stack seems to grow daily, with a large selection to dazzle consumers. While it is impossible to cover every program being released, the following gives a good idea of what is available for the game-hungry Apple owner.

Coming on Strong

On-Line Systems is alive and well, which is good news for game lovers. The best of their latest releases is *Threshold*. Given only a casual glance, the game seems to be nothing more than another shoot-em-up space battle. The player has a ship at the bottom and fires at enemy creatures above. The creatures are birds that flap their wings and fly evasive formations while shooting at the player. Get through the birds and another set of enemies appears. They move differently. The game begins to shine. A third formation appears, then a fourth. If the player hasn't lost all five of his ships at this point, he gets more fuel from the mother ship. New attackers appear. There are many, and it is not likely that anyone will see all of them.

Not only are there a variety of enemies, but each group exhibits substantial differences. They move in different ways, combine in different patterns, and attack differently. Many of the shapes are internally animated. There are wheels that spin, ships that tilt sideways into slim profiles, and objects that twirl like falling maple leaves.

Beyond this, there is still more to *Threshold*. The player can fire rapidly, but his laser tends to heat up. If it overheats, he will be unable to fire until it cools. If fuel runs out before a set of four screens is destroyed, the player loses the game. Finally, the player has a special option that can be used once per ship. By hitting a key, the enemy objects are slowed down for a while, giving the player a brief advantage. Either paddles or keyboard controls can be used in this multi-faceted duel.



The first of many screens in Threshold.

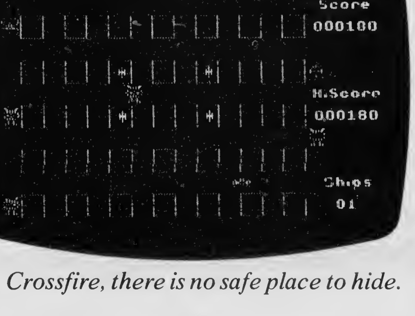
creative computing
SOFTWARE PROFILE

Name: Threshold
Type: Arcade game
System: 48K Apple, Disk Drive
Format: Disk
Language: Machine Language
Summary: Highly challenging and full of surprises
Price: $39.95
Manufacturer:
On-Line Systems
36575 Mudge Ranch Rd.
Coarsegold, CA 93614

The animation in *Threshold* is superb, the game is challenging, and it is unlikely that anyone will tire of playing while the mystery of future screens lies ahead.

creative computing
SOFTWARE PROFILE

Name: Crossfire
Type: Arcade game
System: 48K Apple, Disk Drive
Format: Disk
Language: Machine Language
Summary: The enemy attacks from all sides
Price: $29.95
Manufacturer:
On-Line Systems
36575 Mudge Ranch Rd.
Coarsegold, CA 93614



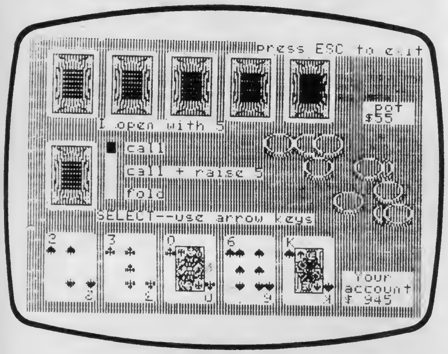
In Crossfire, there is no safe place to hide.

Crossfire is another arcade game from On-Line. Using keys, the player moves around a grid of squares, avoiding the shots of creatures that also move through the grid. The player can fire back, though his bullets are limited. The key controls are a bit tough to master. One set of four keys moves the player, another set is used for shooting. Rather than using a combination such as I,J,K, and M, the programmer chose I,J,K, and L, with K for down. Having the down key between left and right, rather than below it, is a bit confusing at first. Once the player has mastered the controls, he can concentrate on wiping out the enemy. His reward is another set of attackers, and a smaller supply of bullets. *Crossfire*, like *Threshold*, contains good animation, quick response to controls, and a challenge to the player.

Good Bet

Draw Poker from Softape has some of the finest graphics ever done for the Apple. Though the game has been around for a while, it has that quality touch associated with the newest software. The program consists of five card draw for one player against the computer. While a two-player version of poker isn't quite as thrilling as a contest among five or six players, the graphics are so well done and entertaining that the game deserves a look. For each hand, the cards are spread, cut, assembled and shuffled. Each action, except for shuffling, is displayed graphically with a beautiful set of cards. The programmer did a really smooth job. When a bet is made, the chips appear on the screen. When the player or computer wins a hand, the chips are slid to the winner's side of the table.

The one weakness is in the betting system. The only unit of currency is the five dollar chip. Each bet and raise must be five dollars, no more or less. This allows less flexibility in strategy than when the player has a range to work with. While *Draw Poker* doesn't take the place of four friends and a six pack, it will give the poker addict a willing opponent, and also provide a great way to show off the power of Apple graphics.



A hand from Draw Poker.

creative computing

SOFTWARE PROFILE

Name: Draw Poker

Type: Card game

System: 32K Apple, Disk Drive

Format: Disk

Language: Machine Language

Summary: Superb graphics

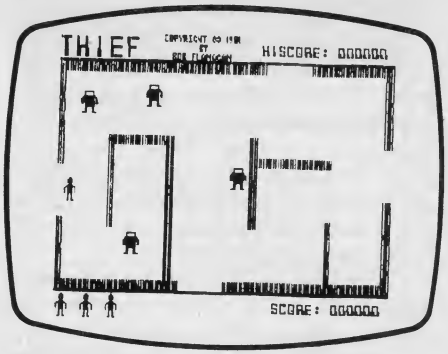
Price: $29.95

Manufacturer:

Softape
10432 Burbank Blvd.
North Hollywood, CA 91601

Follow the Bouncing Ball

Datamost gives players a dose of pulse-driving action in the guise of *Thief*. The player must make his way through a series of rooms, avoiding such dangers as collision with walls, fire from enemy robots, and an indestructible smiling bouncing ball. In defense, the player has a gun. Control is through a joystick. Moving the stick moves the player. Holding the button while moving the stick points the gun. If the button is released while the stick is held to any side or corner, a bullet fires. A self-centering joystick is highly recommended for this one.



Slow humanoids don't last long in Thief.

At the start, the player is in a green room, and the robots don't shoot. After a certain score, the rooms become blue and the robots fire back. Later, the room becomes orange and the robots fire more frequently. Some of us have even had a brief peek at violet walls before being blown away. Unlike the arcade version, the robots in *Thief* can't be tricked into colliding with walls. But they can be destroyed by the bouncing ball. This is a game that can't be played just once. No one here has been able walk away from it without "just one more try." Since its arrival, *Thief* has stolen a great deal our time.

creative computing

SOFTWARE PROFILE

Name: Thief

Type: Arcade game

System: 48K Apple, Disk Drive, Joystick

Format: Disk

Language: Machine Language

Summary: Highly addictive and hard to beat

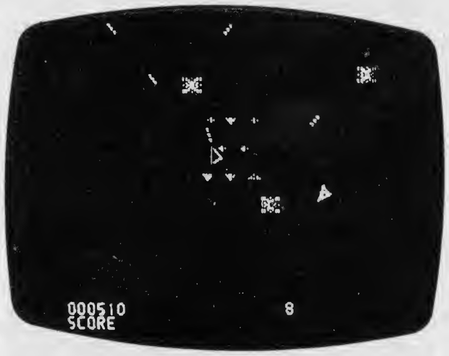
Price: $29.95

Manufacturer:

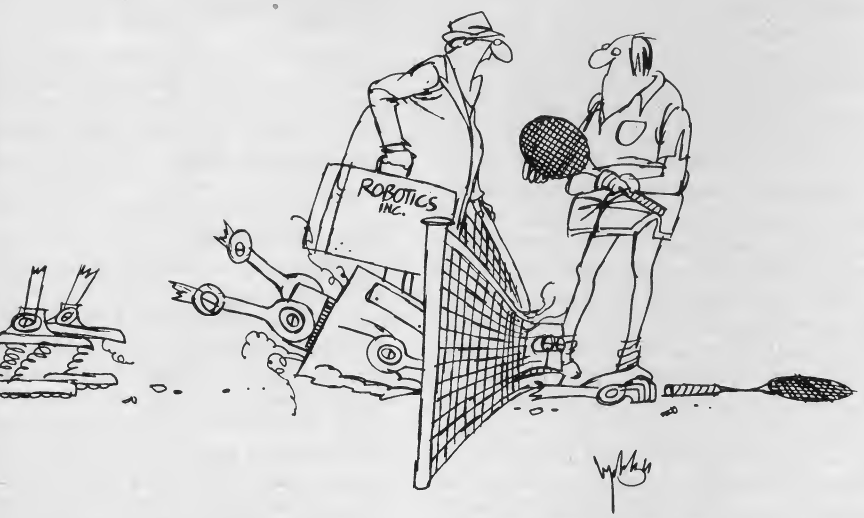
Datamost
9748 Cozycroft Ave.
Chatsworth, CA 91311

Two Can Play as Cheaply as One

In *Star Thief* from Cavalier, the thieves are the enemy. They are trying to steal power pods that the player must guard.



Two players can work together in Star Thief.


ROBOTICS INC.

"...I said he's programmed to return serves,...not drop shots..."

The player, using a paddle, can shoot and fly. He has an unlimited number of ships, but a limited supply of pods. The strength of the game is that it can be played by two people. If they cooperate, working together to guard the pods, the game can last a long time. Even when played solo, the game is good. The thieves aren't hard to shoot, but they keep coming. And whenever the player is hit, he must wait a few seconds for a new ship.

Controlling the ship with a single paddle is not difficult. The paddle rotates the ship and the button, if held, supplies thrust. A jab of the button produces a burst of missiles. This allows players to concentrate on the game without worrying about the keyboard. *Star Thief* is a fine addition to the small supply of two-player cooperative games for the Apple.

creative computing
SOFTWARE PROFILE
Name: Star Thief
Type: Arcade game
System: 48K Apple, Disk Drive, Paddles
Format: Disk
Language: Machine Language
Summary: Fun for one or two players
Price: $29.95
Manufacturer:
Cavalier Computer
P.O. Box 2032
Del Mar, CA 92014

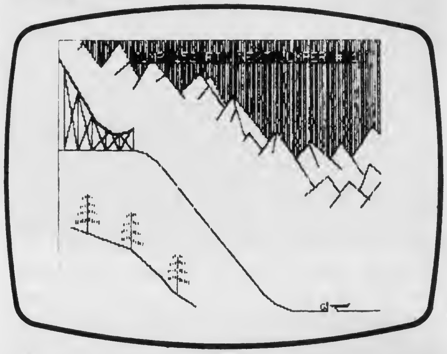
Uplifting Experience

3-D Skiing from Continental Software pairs Slalom and Ski Jump, making a fun package for sports fans. The jump is presented as a side view. From one to four players can compete in up to 99 jumps. Each jump starts with a press of the paddle button which gets the skier moving. Another button press at the right time launches him from the end of the ramp.

Once in the air, the lean of the skier is controlled by the paddle. A proper lean stretches out the jump. If the player leans too far, he loses balance. This can result in a spill that is almost as violent as the famous "agony of defeat" segment from *Wide World of Sports*. The player must also straighten out to land. If he doesn't, he finishes the ride sitting down. While a good technique can be developed for jumping, it is not so easy to master that it becomes automatic.

Slalom offers three courses, three levels of difficulty, and short and long versions of each course. The game gives a view of the back of the skier, looking down hill. The object is to ski through all the flags without hitting any or taking a spill. A paddle controls the direction the skis are pointed. If they are straight, the player moves forward, picking up speed. Turning the skis results in the skier turning in that direction. Turning also cuts down speed. Thus, the player who cuts the flags at the narrowest angle will get the best time, though he also runs the greatest risk of hitting a flag.

creative computing
SOFTWARE PROFILE
Name: 3-D Skiing
Type: Sport game
System: 48K Apple, Disk Drive, Paddles
Format: Disk
Language: Machine Language
Summary: The jump is a killer
Price: $24.95
Manufacturer:
Continental Software
12101 Jefferson Blvd.
Culver City, CA 90230

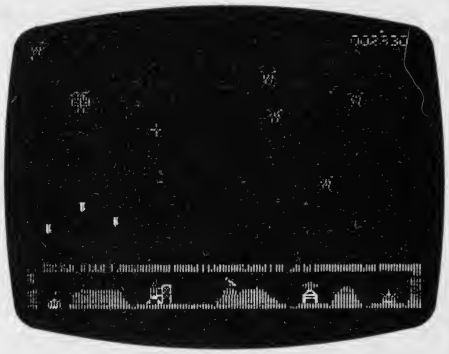


Ski Jump gives a new meaning to fear of flying.

The only weak point of Slalom is that the player cannot change courses or levels without rebooting the disk. This option would have been a nice addition. Except for this, *3-D Skiing* is fun to play and fun to watch.

Sudden Terror

Red Alert from Broderbund is a fast-paced, frantic game that has the player defending the bottom of the screen from a mass of attackers. Instead of just defending the standard ship or base, the player protects a series of installations, including radar, missiles, and a shield repair system. Above these facilities is the shield and above the shield are the attackers. They rain down missiles that eat away the shield. The player moves a crosshair, firing simultaneously from two guns at either side of the screen. The shots burst out in a circular pattern, destroying anything that enters the perimeter of fire. Once both guns have been destroyed, the game is over. The player can launch a special missile that destroys everything on the screen. He gets a new missile every 2500 points, but if the missile launcher is destroyed, no more missiles can be earned. Radar increases the spread of the player's fire. The repair unit mends the shield at 10,000 points, and again at higher values. Once any of these specialized units is destroyed, it is gone for good unless the player is lucky enough to shoot one of the rare supply ships that zips across the screen.



The player's shield is quickly destroyed in Red Alert.

The standard attack comes from swooping, dodging creatures that drop small missiles. Occasionally, a larger creature, looking somewhat like an Apple from *Apple Panic*, comes along and drops a cluster of larger missiles. These really do a job on the shield.

creative computing
SOFTWARE PROFILE
Name: Red Alert
Type: Arcade game
System: 48K Apple, Disk Drive,
Joystick (Recommended)
Format: Disk
Language: Machine Language
Summary: Fast-paced and tough
Price: $29.95
Manufacturer:
Broderbund Software
2 Vista Wood Way
San Rafael, CA 94901

The game demands total concentration from start to finish. There is no chance to relax for a second. Some will find it too fast paced, but those who have mastered its predecessors will find a real challenge in *Red Alert*.

Words for the Wise

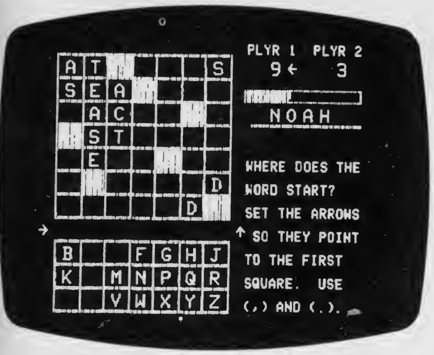
Cross Clues from SRA is an original word game designed for the computer. Two players take turns trying to guess words in a crossword-style grid. On each turn, a player first tries for a complete word. If he is correct, he gets another guess. If the word is incorrect, any letters in the correct position are kept, and any correct consonants are also displayed wherever else they appear on the grid. Next, the player gets to select a single consonant. This is also displayed wherever

creative computing

SOFTWARE PROFILE

Name: Cross Clues
Type: Word game
System: 48K Apple, Disk Drive
Format: Disk
Language: Machine Language
Summary: An original word game for two players
Price: $29.95
Manufacturer:
Science Research Associates
155 N. Wacker Dr.
Chicago, IL 60638

it occurs in the grid. Points are scored for each occurrence of a letter. Each turn is also restricted by a time limit, and good players have their time cut in half.



```
PLYR 1  PLYR 2
  9←      3

   NOAH

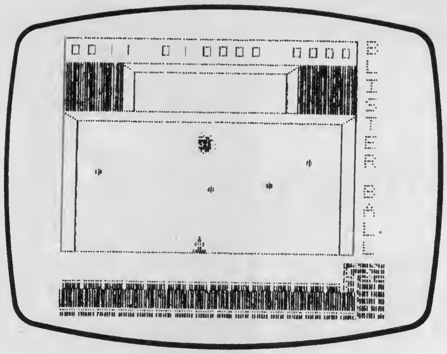
WHERE DOES THE
WORD START?
SET THE ARROWS
↑ SO THEY POINT
TO THE FIRST
SQUARE.  USE
(,) AND (.).
```

A game of Cross Clues in progress.

Though the puzzles contain a fair number of short words, the vocabulary is sophisticated, and even puzzle experts will find the game to be a test of their skills. The disk contains 50 puzzles. An option for creating new puzzles would have been thoughtful. As is, owners of the game will have to wait and see if SRA will be releasing new puzzle disks.

Call in the Bouncer

While I try, in the interest of avoiding conflicts, to refrain from reviewing many programs from Creative Computing Software, there's a new game that is just too good to keep quiet about. *Blisterball* starts with the traditional ship at the bottom of the screen, but takes off from there in a different direction. High above, in an enclosed area, balls bounce. When the game starts, one ball drops, bouncing off the floor and walls. The player must avoid being hit, and try to shoot the ball. If he succeeds, two balls drop. After this come three, then four, and finally five. If the player is still alive, he gets to try for five bonus balls which drop one at a time. These balls are worth ten times as much as the others, but they fall faster and don't bounce. In the next round, the balls are worth more, but they don't bounce as high. With each round, they lose elasticity. In each bonus round, the balls fall more quickly, requiring fast reflexes and a good aim. When the balls get too low, the walls begin to close in.



As one ball dies the others keep bouncing in Blisterball.

The game has two skill levels, and options for play by one person, two playing as a team, or two playing in competition. Almost everyone who has tried the game, including arcade addicts, has been quickly destroyed the first few times. A ship can take three hits before being knocked into the gutter. Those hits come pretty quickly when dealing with the multiple bouncing balls. On the weak side, the program doesn't save the high score to disk. Aside from this, *Blisterball* is a fine arcade game that offers good play value.

creative computing

SOFTWARE PROFILE

Name: Blisterball and Mad Bomber
Type: Arcade game
System: 48K Apple, Disk Drive, Paddles
Format: Disk
Language: Machine Language
Summary: A new twist in action games
Price: $24.95
Manufacturer:
Creative Computing Software
39 East Hanover Ave.
Morris Plains, NJ 07950

The package also contains *Mad Bomber*, a game where one or two players attempt to shoot bombs dropping from overhead racks. The racks start out empty, then quickly begin to fill. Whenever a rack has four bombs, it drops one. The player has a limited amount of ammunition, but can reload by moving all the way to the side of the screen. If a bomb hits a player, he loses ten rounds of ammunition. When ten bombs hit the ground, the game is over. Though not as strong as *Blisterball*, *Mad Bomber* is a lot of fun in the two-player cooperative mode, and very challenging as a solo game. ☐

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Sports Corner

Clockwise from lower left. John White, Bob Callan, Peter Fee, Owen Linderholm, and unidentified friend.

Owen Linderholm and John White

We recently received the Indoor Soccer module from Texas Instruments and being diligent, as we are, we immediately dropped the fun things we do around here, such as converting from the TRS-80 to the Atari, and put the game through its paces. Before too much time had passed, an Indoor Soccer Tournament had been scheduled. As they say, it's no picnic.

As word of this prestigious tournament spread, a number of All Stars signed up. The participants were Bouncing Bob Callan, Peter "Pele" Fee, the grizzled English veteran Owen "Legs" Linderholm, Jumping John White, Dave "Rock'em" Rogers, Giorgio Sternecker, and Dynamic Dave Lubar, who is odds-on favorite to win at any computer game we play.

Just the fact that we held a tournament with this game says something. It is, in fact, a heck of a lot of fun. The best way to describe it, however, is to let the winner of the tournament speak his mind. This interview took place in the locker room of T.I. Stadium, located within the spacious confines of our Software Development Center, and was conducted by that notable sports reporter, Warner W. Cosell.

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SOFTWARE PROFILE

Name: Indoor Soccer
Type: Sports Game
System: TI 99/4
Format: Plug-in Rom Module
Language: Machine code (9900)
Summary: Fantastic
Price: $29.95
Manufacturer:
Texas Instruments Inc.
P.O. Box 5012
Dallas, TX 75222

W.C.: Hello again, everyone, this is Warner W. Cosell, speaking of sports. I'm here in beautiful downtown Morris Plains, where I have just witnessed a battle of monumental proportions. After scouring the world and even looking in the back room of our warehouse, the organizers of this tournament invited a few top athletes to compete in the first annual T.I. Indoor Soccer Tournament. The athletes all declined, so they dug up some of the characters who work at Creative Computing. After many gruelling matches, Jumping John White emerged as the winner.

First of all, congratulations on a hard won victory. To what do you attribute your success?

J.W.: I was better than the rest.

W.C.: Seriously, though, how would you summarize this tournament?

J.W.: Well, almost all of the matches were close. Aside from Bouncing Bob, "Rock'em" Rogers and the great "Pele", everyone was pretty equal.

W.C.: Would you care to explain some of the details of the game?

J.W.: Yes.

W.C.: Would you elaborate on that?

J.W.: Since we didn't have the remote wire controllers, we had to use the keyboard controls, but they were surprisingly good apart from being a bit too close together for comfortable play. The controls manipulate a "Control Player," while the rest of the team operates independently under computer control. By attempting a tackle, one can switch Control Players.

W.C.: How about passing?

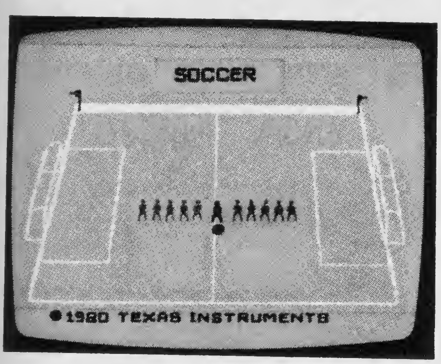
J.W.: Once the Control Player passes the ball, the receiver becomes the Control Player. This can set up some interesting passes off the walls and some tricky bank shots can be made.

W.C.: What I really wanted to know is whether you had any difficulty controlling the ball in passing and shooting. Could you tell our viewers about that?

J.W.: With a bit of practice you can be accurate on the great majority of kicks unless you are like "Pele" Fee, who is a bit of a slow learner.

W.C.: Judging from the tournament results this is a high scoring, offensive game and you're one of the most offensive players I've seen.

J.W.: I'm not quite sure how to take that remark, but actually I pride myself on my defense. I get as much of a thrill out of a nice interception or a good tackle as I get out of a goal. Interceptions are made by moving one of your players into the path of the ball. Except for the occasional fumble, he then gains control of the ball. Tackles are harder and involve good positioning as you attempt to kick the ball while it is in the other player's possession. You can succeed, fail or cause both players to lose control of the ball, depending on how skillful you are. The danger of playing tough defense is the potential for fouling. Giving away a penalty kick is an almost certain goal for the opposition. A good player can hammer home a shot in either corner of the net.



W.C.: Let's go to the videotape. A nice feature of the game is that you can do an instant replay of a goal. SWISH!!

J.W.: Nice goal!!

W.C.: Now that I've conducted the interesting part of the interview, let's go to my colleague, Earnest Glifford, to hear about the more mundane aspects of the game. Earnest?

E.G.: Thank you, Warner. I was immediately impressed at the beginning of the game with the graphics and sound effects. It is also multi-lingual, has time-outs, and all the excitement of the real thing. The game costs $29.95 from Texas Instruments.

The main features are: keyboard or joystick control; passing; tackling; interceptions; replays; timeouts; multi-lingual capability (English, French, German, Italian and Dutch); 3-D high-res graphics; goal-kicks; penalty-kicks; free-kicks; blocking; interceptions; and sound effects (crowd noise, referee's whistle, musical encouragement).

Before signing off, let us have a moment of silence for Giorgio Sternecker who was kidnapped just prior to the start of the tournament. He is now rumored to be on the trading block, with California a good bet. (a very short pause)...and now...

Thank you very much, John, nice having you here with us at Channel 2001 Studios. Now a break for a word from our sponsors, Creative Comp............. ☐

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Benjamin Franklin

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Robert Taylor, Director of the Program in Computing and Education at Teachers College, Columbia University states, "it's a good idea to have a book *for chidren*."

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creative computing press

Invaders for the TRS-80

Owen Linzmayer

The software market has been saturated with versions of Space Invaders for the TRS-80; few great, some OK and many horrendous. Rather than criticizing the deplorable, this review is intended to praise two exemplary programs modeled after the famous arcade game. The programs are Super Vaders from Soft Sector Marketing and Space Intruders from Adventure International.

Space Invaders is the grand-daddy of arcade games. In it, rows of aliens march left and right, criss-crossing the screen, launching lethal missiles at the lone defender below. When the army of invaders reaches either side of the screen, it drops down one step closer to the player's laser base. If the invaders manage to get down to the level of the cannon, the game is over and the Taito Corp. is twenty-five cents richer.

As the number of intruders decreases, the speed of the remaining aliens increases. When the first screenful of invaders has been cleared, a second, faster group appears; only this time they start off a notch lower than the preceding wave.

Even though there are four shelters to protect him, the player must constantly be on the alert as he glides across the bottom of the screen picking off any unfortunate invader that gets caught in his line of fire. Occasionally, a UFO will transverse the uppermost portion of the sky, daring the player to blow it away.

Although these UFOs are worth big points, their objective is to draw your attention away, in the hopes that you won't notice an oncoming missile. The arcade version of Space Invaders is endless, if you can manage to keep one base intact you may play forever, racking up scores in excess of hundreds of thousands of points.

Super Vaders

Super Vaders is a machine language program written by Larry Ashmun of Soft Sector Marketing. It is a modified and greatly enhanced version of Invaders Plus. There are nine levels of play, not including the Blitz mode. Blitz is not for the timid; bombs are hurled towards you at dizzying speeds as the invaders whiz through the heavens. I'm told by the author that the number of boards/screens in the Blitz mode is infinite, but I have never gotten past the second set of insuperable invaders.

If you are playing any level other than Blitz, you must destroy only four waves of invaders before the game is over. This is a slight drawback, but with nine levels of play, the game is challenging to novice and expert alike. At the beginning of each new onslaught, the number of laser bases is always four (these will disappear quicker than you think).

The sound-effects are exceptional.

Every time one of your bases is destroyed, the number of ships left is flashed momentarily where your last ship was hit. This is a novel feature that more programs should use. In the old version of Invaders Plus, you could only do one thing at a time, move or shoot. In Super Vaders you can do both simultaneously, with rapid-fire shooting no less!

Creative Computing

SOFTWARE PROFILE

Name: Super Vaders

Type: Arcade

System: TRS-80 Model I/III, 16K

Format: Cassette or disk

Language: Machine

Summary: Top of the line Space Invader game for the TRS-80

Price: $15.95 (cassette); $19.95 (disk)

Manufacturer:
Soft Sector Marketing
6250 Middlebelt
Garden City, MI 48135

The sound-effects are exceptional. Something is always coming out the cassette port, from the zapping of an invader to the ever-increasing background tempo which intensifies the game.

There are only two small complaints I have about this game. The first dealing with the scoring: your score is only shown after the game is completed. This is a minor problem but I can see why it was done this way. To have on-screen scoring, the top row would have to be set aside for the score section instead of being reserved for the UFO ship.

My second complaint is that the two-player option is not really that at all. The second player doesn't get to man the controls until after his opponent has been annihilated four times and is finished with his game.

Space Intruders

Space Intruders, also a machine language program, is written by Doug Kennedy. It differs from Super Vaders in that it is modeled after Space Invaders Part II (commonly know as Deluxe Space Invaders). Intruders replicates every aspect of the arcade game, and very well, I might add.

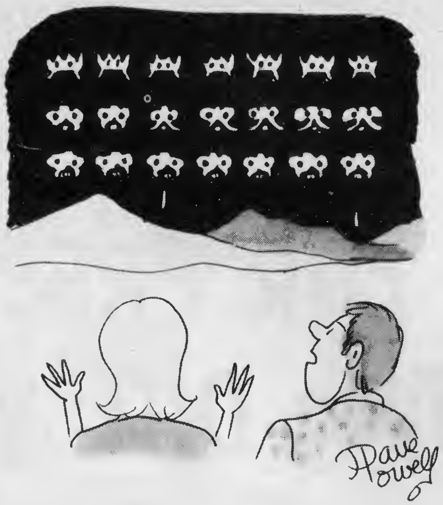
One of the first differences between the original and deluxe arcade games you will notice is that there are "splitting invaders." That is, if you hit one, it duplicates itself and a clone appears beside it. These two do not split again if hit.

There are three different types of UFOs in Space Intruders; the regular ship, a flashing ship and a reinforcement ship. The flashing UFO blinks on and off as it flies across the screen. To destroy it, your laser blasts must hit it when it is "on." The reinforcement ship periodically comes by to drop extra aliens into the empty slots in the uppermost row. This can be nerve-wracking when you thought you were almost finished with a wave and suddenly more intruders are strewn in your path to victory.

Space Intruders is so much like Deluxe Space Invaders that it even has two features many people don't even know exist in the arcade game. The first is "counting your shots." Contrary to popular belief, the UFO point values are not random, but rather follow a pattern depending on the number of shots you have fired. By counting shots and hitting the UFO at the right time, you can consistently get the maximum point rating.

creative computing
SOFTWARE PROFILE

Name: Space Intruders
Type: Arcade
System: TRS Model I/III, 16K
Format: Cassette or disk
Language: Machine
Summary: Excellent TRS-80 rendition of Deluxe Space Invaders
Price: Space Intruders $14.95 tape Model I and III, $20.95 disk Model I
Manufacturer:
Adventure International
Box 3435
Longwood, FL 32750



"Come now, Mary—what makes you think we're being attacked by invaders from outer space?..."

The other feature, one that only a few people know about, is referred to as the "rainbow effect." If the last alien on the screen is one from the bottom row and you destroy it, you are awarded bonus points and treated to an interesting graphics display (the rainbow).

There is a two-player option in this program in which players alternate turns after being destroyed, but the time allotted for changing positions is not sufficient.

One extra ship is awarded at 2000 points; that's the only freebie you'll get, so use it well. Unlike Super Vaders, this program does have on-screen scoring and also lets the high-scorer input his name (eight letters maximum). On the lower left, the number of ships remaining is shown and at the right, the number corresponding to the wave you are presently battling.

Both Super Vaders and Space Intruders use excellent sound routines and lightning-fast, smooth graphics. They are the top-of-the-line Space Invader games for the TRS-80. I don't recommend one over the other because they are modeled after different games.

Contrary to popular belief, the UFO point values are not random.

If you like the original Space Invaders then get Super Vaders, if you prefer the Deluxe arcade game, then by all means, get the Space Intruders program. Better yet, buy them both. Then you'll have all the invader games you'll ever need. Both games are virtual black-holes, capable of sucking up hours and hours of play time while improving your game. ☐

Atari Games *(Continued from page 101)*

Asteroids

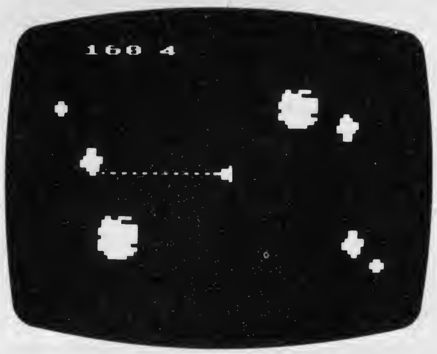
As an addict of the arcade version of Asteroids, I really looked forward to this game. I had begun to design an Asteroids game for the Atari (laid out the player shapes and so forth, and had the basic algorithms worked out), but when I heard Atari was releasing a version, I gave up.

I'm not sure I should have.

Asteroids, as you probably know, is a game which places you in a ship in an asteroid field. You shoot at the asteroids, which break into smaller asteroids, and try to avoid collisions. Occasionally an enemy ship enters the field and fires at you.

This version of Asteroids is apparently written in graphics mode 7 (Basic) or Antic mode 13. This means it has a "chunky" feeling to its graphics. If you have ever played TRS-80 asteroids you know what I'm talking about.

This is particularly surprising when mode 14 is available (graphics 7 1/2) with much better four-color resolution. Indeed, I had planned to use this mode for my version and include three different colors of asteroids. Even graphics 8 (Antic 15) would be a possibility if multicolor asteroids were not required.



Asteroids.

Anyway, I find the low resolution look of the asteroids quite annoying. Also irritating is the very large distance between "turn points" on the ship; in other words, a minimum turn is a large distance.

The missiles are limited to four and probably not done with P-M graphics, as there is an option for up to four players at once. Ah, well.

The joystick is used as follows: right and left are rotate, forward is thrust, back is hyper/flip, your 180 degrees/shields. The shields are not "timed" as in Deluxe Asteroids, by the way, making for a rather predictable game.

Rating

Alas, this one is not as good as Missile Command. I liked it, but not enough, and it could have been done better. Possibly the video game version and this version were made as similar as possible to cut development costs. I can understand the problems, having worked this out myself (for example, how to rotate a rocket in only 8 bits; it looks pretty weird in some angles), but still, much better resolution could have been achieved.

The multi-player option is a lot of fun, and my wife and I spend much time shooting at each other.

One thing you will notice, again, on most Atari games is that they are not CPU bound. On a version written for another machine, there is a very noticeable slowing of the game when there are many asteroids present. This is the result of all the table updating, checking for collisions, and so forth. The Atari version runs at a constant speed, and is fast.

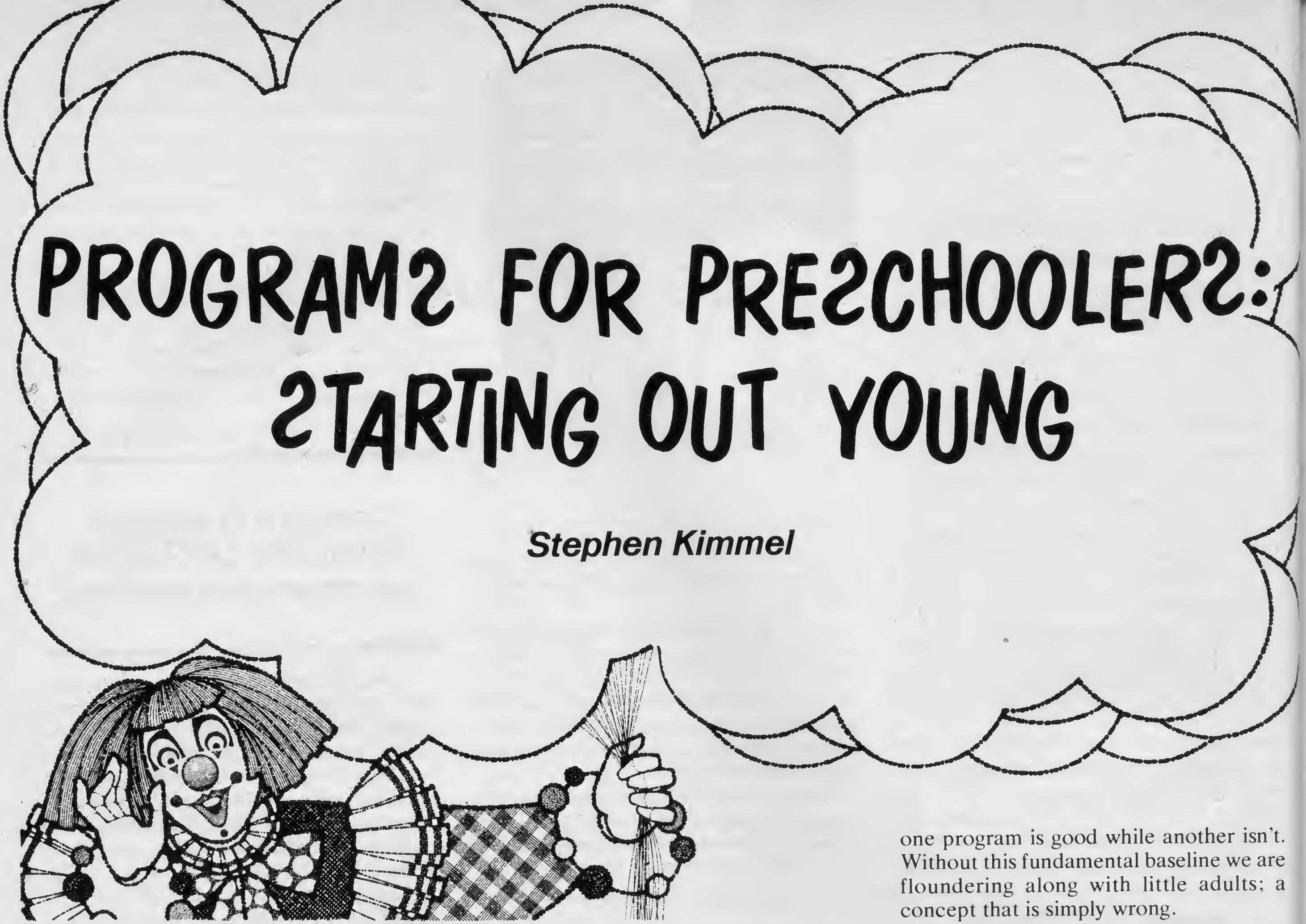
Summary: I play Missile Command much more than Asteroids.

Conclusion

All in all, these were fun games to play. Asteroids will entertain those of you not spoiled by the arcade version, which I admittedly am. It is a good sign that these games exist, as it means that more good software for the Atari is becoming available. ☐

PROGRAMS FOR PRESCHOOLERS: STARTING OUT YOUNG

Stephen Kimmel



In my early days with the personal computer, I took the company's computer home (note: this is the cheap way to get started with home computers—get somebody else to buy one) and slaughtered Klingons by the thousand. But none of their maneuvers terrified me as much as hearing the pitter patter of little feet and feeling the tug on my shirt sleeve. Reluctantly I would look down to see my 18-month old son, Robert, smiling beatifically. Has anyone heard words more certain to freeze your blood than "Daddy, I wanna play compooter?"

"No, you slimy little brat! This is my toy and you can't have it!" I screamed in my mind, and almost instantly felt remorse. I could give the kid a complex of some kind. He would be traumatized, fail in school and life, become an axe murderer and kill me one night as I vanquished Klingons for the eight jillionth time. Not a pretty picture.

"No. This is too easy to break," I thought. That, too, sounded terribly lame.

"Sure. Why not? After all I didn't buy it," I thought. That was the clincher so I smiled, reached down and lifted him onto my lap. Robert's response was immediate and exuberant. Pound. Pound. Pound with both hands on the keyboard. "No. No. Push the keys. Don't pound on them."

Push. Push. Push. Pound. Pound. Pound.

Three hours later, after I had finished cleaning the jelly from my computer keys, I paused to consider the situation. Kids, it seems, are interested in whatever interests you. If I was going to have the computer at home, I was either going to have to lock it and me in a room or play with it only at night. Or I was going to have to find something Robert could do with it.

Kids, it seems, are interested in whatever interests you.

For a while Robert was satisfied with simply pushing the keys and watching the letters disappear off the top of the screen. After only a month or two that got old. Then I began my search for software suitable for a preschooler.

It is worthwhile to consider the qualities of preschoolers that make them unique in the computing population. This will provide us with some key information about why one program is good while another isn't. Without this fundamental baseline we are floundering along with little adults; a concept that is simply wrong.

First and foremost, preschoolers can't read. This is almost the definition of a preschooler. So obviously the program can't have written prompts. Rewards and punishments can't be in plain English. This sort of communication occurs to us, as programmers, first because it requires the least thought on our part and we are comfortable with it. Preschoolers, however, make it impossible. All of the communication between the computer and the preschool operator has to be nonverbal. Fortunately, there are many other ways to communicate. To use them requires more planning and greater skill on the part of the programmer.

The most important means of nonverbal communication is visual. Almost all home computers are capable of reasonable graphics. Even the TRS-80 can generate a face that the youngest of preschoolers can recognize. The infant learns to recognize faces and facial expressions as communication almost before it learns anything else. Using this in a program requires no great skill. You simply show a smiling face when the child has done the right thing or a frowning face when the answer is wrong. Some of the programs reviewed take that one step further and have the head nodding approval or shaking to signify no. Everyone understands that.

Sound can be a very important part of communication. Needless to say, most

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Steve Kimmel, 4756 South Irvington Place, Tulsa, OK 74135.

Robert at 18 months during the first Creative Computing *Chess Tournament. A big help.*

preschoolers understand the spoken word long before they can read. The sound of something—an explosion, a musical tune—communicates as effectively as printing "Your ship has been destroyed by the Klingons."

The second key characteristic of preschoolers is that they don't have well developed problem-solving skills. In most cases it is probably valid to define a game as competitive problem-solving. Most younger preschoolers don't understand the concept of "game." Let a group of two-year olds play in a room and you have a room full of two-year olds playing by themselves. There is no sense of cooperation or playing together.

One of the recommended "games" for young children is to have them stick baby food jar lids through a slot. It is, for the very young, a staggeringly difficult task. Thus we can eliminate the majority of the traditional games.

The preschooler can only understand simple cause and effect. If I do this, it does that. Push the bowl, it falls on the floor. And even that was a surprise not too long ago. The level of depth to which they think ahead is quite limited. The preschooler's game has to be very simple with immediate results for actions.

Third, the preschooler hasn't developed particularly good coordination yet. One finger at a time is about all he can handle. Certainly anything requiring the hands to be doing different things simultaneously is beyond preschoolers. It's a skill I developed when I was about 12.

The preschooler doesn't react quickly. Even older preschoolers seem to have rather slow reaction times. So games that require moving quickly aren't very good either. The problem is that the child is easily frustrated at his own inabilities, and the experience can become an unhappy one quickly.

The class of games that comes to mind immediately is the arcade type game. To challenge an adult requires quick actions, frequently with both hands. The preschooler will be attracted to this sort of game, but won't be able to play.

It is necessary to address the issue raised by Sally Greenwood Larsen in her book Computers for Kids. She states, "I can't emphasize this one enough. Don't ever let your children play commercial game tapes until they are accomplished programmers! By 'accomplished' I mean the end of the first year (of programming classes) for most children."

Robert at 3 1/2 years is a seasoned veteran who knows what computers are for—fun!

Her argument is that kids exposed to the fun of the slick commercial games will lose all interest in programming. She also states that the only games a child should be allowed to play are the ones he has programmed himself. The effect of this is that no preschooler should be allowed to play with the computer since the earliest he can be expected to be an "accomplished programmer" is about five years old.

The argument is specious. It is akin to saying children shouldn't be allowed to read the classics until they are accomplished writers. Most educators agree that the children who become the best readers, the best students, etc., live in homes filled with books. The parents show respect for books, read frequently and begin to read to their children regularly at an early age—sometimes before the end of the first year.

Reading begins as a close, comfortable sharing experience long before it has any significance as a conveyance of ideas. How different is sitting on your father's lap listening to a book from sitting on your father's lap playing a computer game?

There are differences, and the most obvious is that in one activity you are passive while in the other you are actively affecting the outcome. More important, however, are the similarities. You are warm, have a good feeling about yourself, your father, your book and your computer.

Interestingly enough, it is the good readers who become the good writers. All the professional writers I know are voracious readers. They have a love affair with words and it doesn't seem to matter whether the words are coming in or going out. Almost none of them were "accomplished" writers until their teens. Some didn't become competent writers until much later in life. The fact remains that all of these professional writers were good readers at an early age and all started their contact with books long before they learned to write.

I suspect that almost all of Miss Larsen's students come from homes without computers. Her experience must be similar to teaching students who have never seen a book to read and write. Her students may eventually become competent programmers and be able to use the computer to good advantage as adults. Will they become great programmers? Will their programs become classics? Did Shakespeare's mother read to him as a child? I don't know. But I firmly believe that the preschooler who learns to love and respect the computer before he can program will ultimately be better for the experience.

I'll begin the review of some programs that might be suitable for preschoolers by reviewing the qualities we want. It should make extensive use of nonverbal communication. It should give immediate results to actions and require no great amount of strategic planning. It shouldn't require great speed or coordination. Like any program, it should be reasonably priced and free of bugs. Where do you find these programs?

Nine Games

Robert's favorite computer game and, in my opinion, the creme de la creme is George Blank's Nine Games for Preschoolers. I mention it first because it was about the first attempt at designing a computer program for the personal computer with the preschooler in mind. This is probably the first program you'll turn to when you start looking for software for your preschooler.

George got just about everything right. There are others who have done some of the things better than this early effort, but none have combined the qualities as well for a package of solid value.

As all you highly perceptive types have already deduced, there are nine games in the package. Letterfun allows the preschooler to type in a group of letters. He then presses enter and the letters do amusing things such as bounce around, explode, and march from side to side across the screen. While this may not seem like much, it will amuse a young preschooler for some time.

ABC has a little face that smiles when you type in the right letter of the alphabet and shakes its head when you type the wrong one. Sometimes getting the shaking head is funnier than the smile so there will be times when the preschooler will intentionally push the wrong key.

Letter Wars is a drill on small letters that pauses every ten letters for a brief space battle. The outcome is determined by whether you got the letters right or not. The graphics here are nothing to write home about, but they are adequate. By age three, Robert was getting over 98% and playing 100 letters at a sitting.

Repeat is a game for much younger children. Here the key pushed is repeated 32 times across the screen forming patterns.

Names provides practice in recognizing names in the middle of text. You type in six names which are repeated in random order filling the screen. It pauses and you and your child pick out individual names.

Blackboard is just what it says. What you type appears on the screen. Troll's Gold is a maze in which doors open and close. Your mission is to get the troll's gold and get out before he catches you and eats you up. If you escape, the screen is filled with dollar signs. If you get caught the troll's mouth slams shut on you. Each game takes about eight minutes, and Robert will play three in a row.

Math Drill is a drill in addition and substraction. Counting blocks are displayed, too. Calculator is a four-function calculator with the display in standard school format. Not a whole lot of fun.

One extremely nice thing about Nine Games for Preschoolers is that all of the games are in memory at the same time. The programs are called from a master menu that doesn't require reading. Pressing the clear key during a game will return the preschooler to the main menu. Part of the strength of the program lies in the fact that the games call for different abilities, and the child will grow out of some and into others.

The net effect is that this program won't be quickly discarded. Educational, well designed, good play. Yep. This program is probably the best. At $9.95 from the TSE this program is an absolute must for anyone with a 16K TRS-80 and preschoolers.

The Software Exchange, 6 South St., Milford, NH 03055.

Dancing Demon has the best graphics I've seen on a TRS-80.

Android Nim

Android Nim by Leo Christopherson, who I am secretly convinced has elementary school age kids, is an example of a planning game that is still good for preschoolers. Christopherson is the acknowledged master of low resolution graphics and Android Nim is an excellent combination of animation and sound.

The strength of the game is in its action. Instead of beans or sticks, the game is played with small robots. They fidget nervously and chatter, which holds the child's attention. After you've entered the number of androids you want to remove, a leader android "looks" to check if your move is legal.

It either "speaks" to affirm your choice or shakes its head to tell you that the move is illegal. Given a legal move, the leader pulls out a ray gun and disintegrates the appropriate number of androids. If the computer wins, it pronounces its victory in large letters. If it loses, the leader robots hang their heads.

Android Nim has action and effective use of nonverbal communication, and requires no great coordination. It does require careful preplanning, if you're going to play it right. However, it can be used as a counting game and as such has some educational value. Preschoolers will enjoy it—at least until they discover that "I WIN" means that they lost and the computer won.

Android Nim is available from Computers 'n' Stuff, 1306 S. 56th St., Tacoma, WA 98408. $14.95.

Dancing Demon

Radio Shack has only two programs suitable for this age group. Dancing Demon may very well earn Leo Christopherson eternal glory. I am amazed at the man's ability. The name of this program is completely descriptive. You program in a song and the demon's dance steps, select a speed and play it all back. On the preschool level this is simply a matter of randomly pushing keys. It does have two prerecorded song and dance numbers and the ability to record your creations. As such it will amuse the preschooler somewhat longer than simply pushing keys and seeing what letters appear.

Dancing Demon has the best graphics I've seen on a TRS-80. The program makes no attempt at nonverbal communication and has no significant educational value. If you want lasting use with your preschooler you'll have to be ready to type in some familiar songs that you can sing together. This program is really for adults who want a cheap ($9.95) introduction to music generation and something to show off their computer. As my local Radio Shack dealer told me, Dancing Demon is a store demo.

I haven't seen Radio Shack's Show and Spell so I'm not really qualified to comment on it. However the review in the March '81 *Creative Computing* was enough to persuade me to cancel my order.

Kidventure

Kidventure 1, Little Red Riding Hood, was written, or at least sold, as a preschool version of the immensely popular Adventure series. Many things about it are very well thought out.

The program comes with two sets of keyboard masks on heavy cardboard that you cut out and color if you like, and use to relabel the keys. This is an interesting and very effective way of overcoming a preschooler's inability to read. When the preschooler wants to answer "Little Red Riding Hood," he simply pushes the key indicated by the picture of the little girl—which happens to be the up arrow. There is almost no possibility of mistaking Grandma for Little Red Riding Hood.

The program also comes with an audio cassette of, presumably, the author and his family reading the story of Little Red Riding Hood. The author raps a spoon against a glass of water and this is the preschooler's cue to press the space bar and advance the story. The screen changes to show the next group of words and a crude graphics picture. This is the program's story mode and what it amounts to is a bad and very expensive picture book.

In the quiz mode the program tells the story and periodically stops to ask a question. When the child answers correctly, the story proceeds. In the quiz mode the program plays appropriate (?) little tunes for each major character and item. Such as "Who's afraid of the (Big Bad Wolf)," "Jeepers, creepers, Where'd you get those (eyes)" and "I've been working on the railroad" for the woodcutter.

Alas, the quiz is no challenge to anyone, including any preschooler who is familiar with Little Red Riding Hood. Robert only missed one question the first time through and I think he was joking ("But Grandmother, where did you get those great big (Beds)"). Robert has only asked for Kidventure twice since the first day.

Frogs

Frogs is another game from Adventure International designed with kids in mind. Here you are a frog sitting on a log floating in a pond trying to catch flies with your tongue. The left arrow and the right arrow control your steps to either side. The frog will shake his head and croak at you if you try to step off the log. Up arrow will shoot your tongue out to the left while the Q key shoots it to the right. When the frog catches a fly it goes through a cute routine of chewing it up. (Robert learned that frogs eat flies from this program.)

There is almost no possibility of mistaking Grandma for Little Red Riding Hood.

After you catch all the flies, the frog thanks you and your score is displayed. The action is good, and demands no great speed or coordination despite requiring both hands. It is easy to play with two of you. Robert normally works the tongue while I control the steps. Although the instructions are quite long, they are simple and once through them is enough.

The program has one problem: each time you use your tongue, it grows shorter. That makes catching subsequent flies harder. The last fly floats around randomly and frustratingly out of reach. This period of frustration and inactivity almost ruins the game. However, it is easily fixed by changing the "IF FL=0 THEN" to "IF FL=1 THEN." You catch all but the last fly and the game proceeds.

Adventure International, Box 3435, Longwood, FL 32750.

So there is no reason at all to hide your computer from your munchkins. Why not start them in computers the right way? Unless, of course, you really mind cleaning jelly off keyboards. ☐

Epoch and Hadron

(Continued from page 106)

creative computing

SOFTWARE PROFILE

Name: Hadron
Type: Game
System: 48K Apple, Disk Drive
(Joystick recommended)
Format: Disk
Language: Machine Language
Summary: A nice sequel to Epoch
Price: $34.95
Manufacturer:
Sirius Software
10364 Rockingham Dr.
Sacramento, CA 95827

Hadron

Hadron features the same unusual graphics, but gives the player a more-specific mission. He must destroy an enemy base. The base is found by following fighters that are returning to their home location. While the player encounters many types of ships and bases, only a specific type of fighter will lead him to the base. Once the player has destroyed the base, he moves up a level and faces fiercer opponents. A color insert in the documentation shows each ship for each level. Players will probably want to keep this handy for their first few games.

As the instructions indicate, the player doesn't have to seek out the enemy base. If he wishes, he can just see how many fighters he can destroy before time runs out. Either way, *Hadron* offers a nice romp for space lovers.

The player is rewarded with sounds that almost have a stereo quality.

Another feature that adds spice to both programs is the music used. When the player in *Epoch* enters a time tunnel or refuels at a base, he is rewarded with sounds that almost have a stereo quality. In all aspects from graphics to ease of control to the small touches, *Epoch* and *Hadron* earn high points. ☐

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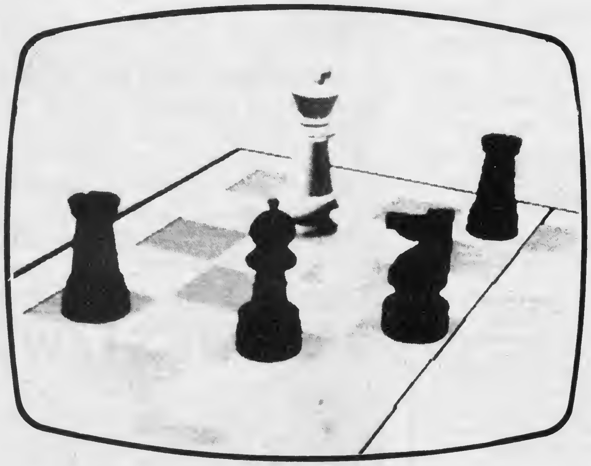
ZGRASS GRAPHICS LANGUAGE



In a few short months, I am able to do things I never thought possible while programming in Basic.

Tom Meeks

There is an aura of mystery surrounding any new language. Perhaps the names of the languages have something to do with it. That old familiar language, Basic, just *sounds* so easy! But, does "easy" come to mind when we first hear the names Pascal, Smalltalk, Forth or Zgrass? Probably not. Yet, once we get behind the names and esoteric jargon we find that, in fact, some of these strange sounding names hide languages that are quite easy to learn and, for many applications, far simpler than Basic to implement.

Since most of us are, by nature, ruled by the laws of inertia we tend to resist the new in favor of the familiar. In my own case, it took a great deal of frustration with the limited ability of Basic to produce animated graphics in a reasonable amount of programming time to initiate a search for an alternative. As luck would have it, I stumbled onto Zgrass, a thoroughly enjoyable graphics language.

My company, Communication Resource Management Systems, is a small video company involved in producing training materials for government and industry. When it became evident that we would have to know about computers if we were to remain competitive in video I began to shop around. After careful search a system was selected and the business of learning Basic was begun.

If my primary objective had been to write checkbook programs or play number games I might still be programming in Basic. However, my goal was to produce computer graphics to enhance the educational value of the video tapes we produce. Frankly, Basic was totally frustrating.

The hardware was fully capable of everything we wanted; Basic just couldn't access that power in anything approaching a reasonable amount of time. Just when I had almost given up computer animation as a lost cause I read a report about SIGGRAPH'80 (*Creative Computing*, January '81) which mentioned a new computer featuring Zgrass, a language specifically designed for animation and video graphics. Taking a chance, I purchased one of the first Datamax UV-1s produced. The results have far exceeded any expectations I may have had. Zgrass is easier than Basic . . . and it works!

Perhaps some perspective can be added to the last statement if I point out that when my Datamax UV-1 was delivered in February 1981, I had never even seen the Zgrass program, and the nearest Zgrass programmer was in Chicago, over 800

Tom Meeks, 11004 Stillwater Ave., Kensington, MD 20795.

miles away. Yet, in a few short months, I am able to do things I never thought possible while programming in Basic—even with the generous help of scores of experts in the Washington D.C. area.

First Impressions of a Basic Programmer

My first contact with Zgrass came in the form of a video tape demonstrating Zgrass animation and video art. It's a good thing I had seen the tape, too, for it carried me through the initial shock of my first contact with the language itself. This shock only lasted for an hour or so, but it was severe! There were no line numbers, no FOR-NEXT loops and more than one program could be stored and run at the same time.

My Basic programmer's head reeled! Build programs and routines without line numbers? Impossible! Produce graphics with no FOR-NEXT loops? Absolutely impossible! As for the multiple programs, I had already had more than my share of trouble trying to get one at a time to run.

With the vision of the taped animation firmly fixed in my mind, I delved deeper into the language. Gradually it became evident that Zgrass was different.

With the vision of the taped animation firmly fixed in my mind, I delved deeper into the language. Gradually it became evident that Zgrass was different. The commands and syntax seemed to make good sense. Common sense. This was in sharp contrast to the graphic statements with which I was familiar when plotting in Basic.

Fundamental Conceptual Differences

Now that I have had several months to explore Zgrass and implement it under the pressure of deadlines and the budget restraints of my clients, I am more than happy to share what I have already learned about this graphics tool. The concepts upon which this language is built deserve to be discussed before the actual coding structure is introduced. Animation, whether by brush or by computer, is dependent on timing for its dramatic effect. This means that the developmental phase must remain fluid so that fine tuning of the animation can be accomplished.

For instance, it's very difficult to anticipate the effect of an explosion of a space ship in a game. It isn't until the explosion is seen, not once but over and over that the real effect can be felt. Not being able to easily isolate and experiment with individual elements of an animated graphic was one of the major frustrations I experienced while programming in Basic.

Basic tends to be linear by nature. We begin at line number ten (a good safe start) and work our way to the end of the program with side trips in GOSUBs and GOTOs. Programs for the simplest animations can become enormous and complex with FOR-NEXT loops rested inside nested FOR-NEXT loops. Fine tuning is difficult and often results in bugs.

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Zgrass, continued...

Zgrass, on the other hand, is more modular in concept. Perhaps the difference can be best illustrated by our fictional space game. In Basic we would write one long program containing every element needed to play the game. Any changes would have to be squeezed into the spaces of the long existing lines. Since the program may be several hundred lines long, finding the particular lines that need to be changed can be difficult.

This same game written in Zgrass would have an entirely different structure. Each element of the game would have its own program, called a macro. Each macro would be assigned a name—usually descriptive of its function—that may be used to call the macro when that particular element is needed. For instance, we might have a macro called BUILDSHIP which draws a spaceship. This macro could be called any time a new space ship is needed on the screen—at the beginning, after a crash, after an enemy victory, etc. In Basic, since only one program is in the memory at one time, we enter the command RUN whenever we want the program to execute. In Zgrass we simply enter the macro name to execute it. This can be done from the keyboard or *as a statement in another macro*.

While this is deceptively similar to a standard Basic GOSUB statement there are some very important differences. The first is the ease with which BUILDSHIP is edited. The simple command EDIT BUILDSHIP brings only those lines used to build our spaceship to the full screen editor.

Additional commands can be loaded into memory when needed, and entirely new commands can be created.

Second, we can execute BUILDSHIP independent of all of the other elements in the space game. There is no need to run the entire game to check on changes. This allows us to focus our entire attention on the details and timing of each element of the game individually.

Third, since Zgrass is modular, this same macro can be used in other games needing a space ship. In Basic, if we wanted to use a subroutine from one game in another, we would normally have to re-enter all the lines through the keyboard. Since Zgrass macros can be saved on tape or disk there is no need to re-enter the shipbuilding routine manually. Simply recall BUILDSHIP and it's ready to use.

This modular format is not the only conceptual difference between Basic and Zgrass. While Basic has evolved with the development of more powerful hardware, it isn't usually considered a user expandable language. On the other hand, Zgrass is definitely expandable. Most commands are contained in ROM. However, additional commands can be loaded into memory when needed, and entirely new commands can be created. As a matter of fact, in the few months since I purchased my Datamax, several new commands have been added to the Zgrass library.

The difference that I most appreciate, however, is the concept that the user should have easy access to *all* of the capabilities of the hardware. It is clear from the articles in *Creative Computing* and other computer magazines that this is not a common philosophy. Zgrass seems to open the entire graphics repertoire of the computer for the user. If you have been disappointed by the performance of Basic compared to what you saw in the manufacturer's demonstration then you'll find Zgrass refreshing.

Getting Started

The quality of documentation is usually the first hint about the overall quality of any system. The documentation that arrived with my Zgrass computer system was packaged in two booklets. The first of these is the *Zgrass Glossary of Buzzwords, Commands, Functions, Idiosyncrasies, Swap Commands, Swap Functions, Switches and Esoterica*. The contents are just as thorough as the title.

One of the drawbacks of working with a high level language is that it is possible to do things without ever understanding the basics of computer logic. Truth tables had never really seemed to be worth the effort to learn until I came across the explanations about OR, XOR, and AND in the Zgrass Glossary.

Whoever wrote the glossary appreciates the fact that there are people who want to use a computer but don't want to earn a mathematics degree to do so. The explanations are clear and concise. Often there are short programs that can be entered and run in a few minutes that graphically illustrate the logical operations. All of the entries are in alphabetical order which makes finding them a snap.

The second booklet is a self-teaching guide. I had some troubles with this one—mostly due to my own impatience. I would begin a lesson dutifully reading and working the examples until something would click inside my head—the old "Hey! That was great . . . I wonder if . . ." and off I'd go on with some wild experimentation until I found myself stuck.

Then grabbing the phone I'd make a plea for help, only to find that the answer was two or three pages further along in the book. After doing this two or three times (and receiving the same courteous "It's on page... reply), it finally began to dawn on me that patience really is a virtue. Once that point was reached the self-teaching guide worked fine.

The System Supports the Graphics

Simple graphics commands do not necessarily guarantee easy graphics generation and animation. Zgrass commands such as POINT, BOX, LINE and ELLIPSE (an expanded circle command) would certainly be useful in any language; but, Zgrass goes beyond these in providing the tools needed to produce sophisticated graphics easily.

While a complete explanation of the Zgrass operating system is beyond the scope of this article, I just can't resist mentioning some of the features that make the job of the programmer or animator so much more enjoyable.

There are four features that I especially appreciate: the full-screen editor, the sophisticated cassette tape interface, the program flow control commands and the priority execution controls that allow for truly interactive program control.

Perhaps nothing relieves the tedious aspects of programming better than a good full screen editor. Zgrass supports, through the EDIT command, a full screen editor that comes remarkably close to being a true word processor. The cursor can be located using keyboard commands or a joystick. Lines can be altered, deleted, duplicated or moved. Obviously, this speeds up the process of building or modifying a macro.

At first glance, it may seem out of place to bring up a cassette tape interface in a discussion devoted to an easy graphics language. But, the key word is *easy*. Anything that takes the hassle out of programming deserves to be recognized. The Zgrass tape handling system certainly qualifies.

One of the frustrations encountered when using cassette tape with most of the popular micros is that once the computer

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The why and what of a software bus

First of all what is a "bus?" And why do we call CP/M "the software bus?"

A "bus" is a technique used to interface many different modules. Examples are the "S-100/IEEE-696 Bus" and the "IEEE-488 Bus." These are hardware buses that permit a user to plug a bus-compatible device into the bus without having to make any other hardware modifications and expect the device to operate with little or no monification.

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This is why we say "CP/M is the software bus" and why *Microsystems* magazine is vital to providing CP/M users with technical information on using CP/M, interfacing to CP/M, new CP/M compatible products and for CP/M users to exchange ideas.

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S-100 is currently the most widely used microcomputer hardware bus. It offers advantages not available with any other microcomputer system. Here are a few of the advantages:

S-100 is processor independent. There are already thirty different S-100 CPU cards that can be plugged into an S-100 bus computer. Nine 8-bit microprocessors are available: 6502, 6800, 6802, 6809, 2650, F8, 8080, 8085 and Z80. Eight 16-bit microprocessors are available: 8086, 8088, 9900, Z8000, 68000, Pascal Microengine, Alpha Micro (similar to LSI-11) and even the AMD2901 bit slice processor. Take your pick from the incredible offerings.

S-100 has the greatest microcomputer power. What other microcomputer system has direct addressing of up to 16 megabytes of memory, up to 65,536 I/O ports, up to 10 vectored interrupts, up to 16 masters on the bus (with priority) and up to 10 Mhz data transfer rate? You will have to go a long way to use up that computing power.

S-100 is standardized. The S-100 bus has been standardized by the IEEE (Institute of Electrical and Electronic Engineers) assuring the highest degree of compatibility among plug-in boards from different manufacturers. And, *Microsystems* has published the complete IEEE S-100/696 standard (all 26 pages).

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has been instructed to load tape you have no idea what's happening—all you can do is sit and wait—and hope. Zgrass eliminates this problem beautifully by including a file directory system with the PUTTAPE and GETTAPE commands. The syntax for PUTTAPE is:

```
PUTTAPE NUMBER,FILENAME,DESCRIPTION
PUTTAPE 2,FLYINGSAUCERSHOOTER,[Creates a slingshot
for CRASHNSMASH]
```

The NUMBER tells how many times the file should be put on the tape, the FILENAME (which can be any length) is the file to be copied and the DESCRIPTION is anything that helps you identify the file.

GETTAPE FLYINGSAUCERSHOOTER would initiate a search through the tape for the proper file, printing out the directory information of all the files it passes. The directory for our example would look like this:

```
STR NAME:FLYINGSAUCERSHOOTER LEN:324 NOTE:

Creates slingshot for CRASHNMASH
```

This directory information plus status messages like BAD DATA and BAD-AUTORETRY save a tremendous amount of programming time. Furthermore, the tape interface is extremely tolerant of random user tape searches. We are constantly skipping back and forth through the tapes with multiple files, using the directories to tell us where we are. The poor man's external random access memory!

Have you ever wanted to try out different colors on that hyperspace explosion? You can in Zgrass.

The simplicity of the commands used to control program flow in Zgrass, while not actual graphics commands, are a third feature of the the overall operating system that contributes directly to making the job of creating graphics easy.

The most commonly used program flow control features used in Basic are line numbers, GOTO, GOSUB and the ever popular FOR-NEXT loop. As mentioned earlier, Zgrass is conspicuous for the absence of most of these features in normal use. Line numbers and GOTO statements can be used by the programmer, but other means of controlling the flow of the program are so easy and efficient that I have not used a single line number or GOTO statement the entire time I have used the Zgrass language.

The SKIP command is the major program flow control statement. SKIP -2 would tell the computer to go back two lines of code, SKIP 6 tells the computer to go forward six lines. Most often these skips are used in conjunction with an IF statement. The IF statement in Zgrass is far more versatile than it is in Basic. Consider the following comparisons:

```
BASIC:     1910 IF A > 10 THEN 1860
ZGRASS:    IF (A=A-5) > 10,SKIP -5

BASIC:     340 IF A   10 THEN GOSUB 5000
ZGRASS:    IF (A=A-5) < 10,BUILDSHIP
```

Notice that the Basic IF statement is simply a testing step. The process of arriving at the variable A is performed outside of the IF statement, usually in a FOR-NEXT loop.

In Zgrass, the IF statement is used not only for testing conditions, but for performing the actual calculations to test. I hope it is also evident that Zgrass programs are easier to follow because subroutines are actually small independent macros which *have names*! In spite of my initial fears, I have found the Zgrass systems for program flow control to be far better than the old FOR-NEXT loops I left behind.

The fourth feature that I appreciate is the ability to run more than one program at a time and assign priority levels to them. If we use .F after a macro name we are saying that this macro has the highest or FOREGROUND priority. If we use .B we are saying that the macro has BACKGROUND priority. It is the BACKGROUND mode that I find most useful. The keyboard remains active while macros are running in the background mode and can even be used to modify the programs as they run. Ever wanted to try out different colors on that hyperspace explosion? You can in Zgrass. Simply run the explosion macro in the background mode and experiment with colors while the explosion repeats indefinitely. This is another example of the superior fine-tuning abilities of Zgrass.

When I first purchased the Datamax UV-1, I was looking for a machine with simple graphics commands. Now I realize that just having simple graphics primitives is not enough. The power of Zgrass begins with the fundamental concepts which underlie the language control structure and moves from there to the commands dedicated to graphics manipulation. The reason that I have placed so much emphasis on these features is that, while I am amazed at the power of some of the graphics commands in Zgrass, I doubt that a linear language with these same commands would be as flexible or easy to use.

Graphics Manipulation Features

The function of the graphics primitives POINT, LINE, BOX and ELLIPSE are self explanatory and not so different from some found in newer expanded Basic interpreters. Other commands used to scroll screen areas, create windows and fill bordered areas with solid colors are also fairly common. There are, however, some provisions for manipulating colors, special commands for manipulating picture elements and remarkable picture arrays called "snaps."

Dr. Tom DeFanti, the originator of Zgrass, borrowed a concept from box camera days and allows us to save individual pictures from the screen with the SNAP command (short for snapshot). Suppose we wanted to create a little creature to be used in a game. With Zgrass you would simply draw it on the screen and "snap" it off. The SNAP command saves the creature and the area around it in a box called a "snap array." The SNAP syntax and an example are:

```
SNAP Snapname,Xcenter,Ycenter,Xsize,Ysize
SNAP ALIEN1,0,0,15,25
```

To retrieve our creature from memory and display it on the screen we use the Display command. Its syntax and an example are:

```
DISPLAY Snapname,Xcenter,Ycenter,Displaymode
DISPLAY ALIEN1,50,25,0
```

The SNAP and DISPLAY combinations are the keys to the rapid animation possible with Zgrass. This macro sends an alien with moving legs across the screen.

```
CRAWLYCREATURE=[A=-190
DISPLAY ALIEN1,A,0,0
DISPLAY ALIEN2,A+1,0,0
IF (A=A+2) < 190,SKIP -2]
```

ALIEN2 would be created by displaying ALIEN1, making the changes to the leg positions and "snapping" it off again with the snapname ALIEN2. By alternating between ALIEN1 and ALIEN2 and moving the display center slightly each time a snap is displayed, we create the appearance that the creature is really crawling. Small snaps can be displayed so fast that you may have to use a timing loop to keep them from being a blur.

Snaps are great. They are fast and easy—no PEEKing or POKEing—just draw and SNAP! Furthermore, they can be manipulated to create a variety of effects. For instance, the PATTERN command lets us fill a bordered area with a pattern of repeated snaps. This is great for fabric design. I have used it to build large brick walls from a small snap of a few bricks. Snaps are central to Zgrass. Each of our three examples relies on snaps as its central graphic element.

Figure 1 is a still representation of an animation showing the space shuttle landing. On videotape the lander would descend, land and roll to a stop. Note the dust which is a snap also.

Figure 2 demonstrates how snaps can be manipulated. Note the various sizes of the dollars. The SCALE command can be used to stretch, squeeze and reverse snaps both horizontally and vertically.

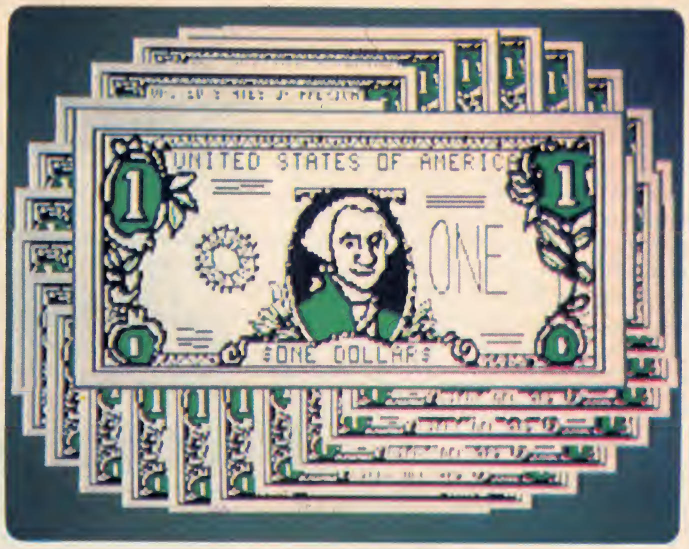


Figure 2. This picture demonstrates a snap being displayed many times on the screen. The SCALE command is used to vary the size of the snap. By Jane Veeder.

The DISPLAY command is greatly enhanced by the rich color manipulation alternatives provided. These include a complete color filtering system, as well as, automatic OR, AND and XOR. I never really understood these logical operations before working in Zgrass; they seemed far too complicated to be bothered with. Now, I couldn't get along without them. Not only are they useful for dramatic effect, but they save programming time. If we were to program a football game only one team would have to be drawn. The other would be a duplication of the first using the XOR mode and color filters.

The weather map in Figure 3 demonstrates how the color filters can be used. The color filters trim away unwanted colors when snaps are displayed. Notice that the snaps at the bottom of the screen (sun, clouds, etc.) each have a colored border area. Obviously, that border would be unacceptable on the map so the special display mode color filters are used to eliminate it. By the way, this picture (and Figure 1) illustrate user-defined typefonts made possible in this versatile language.

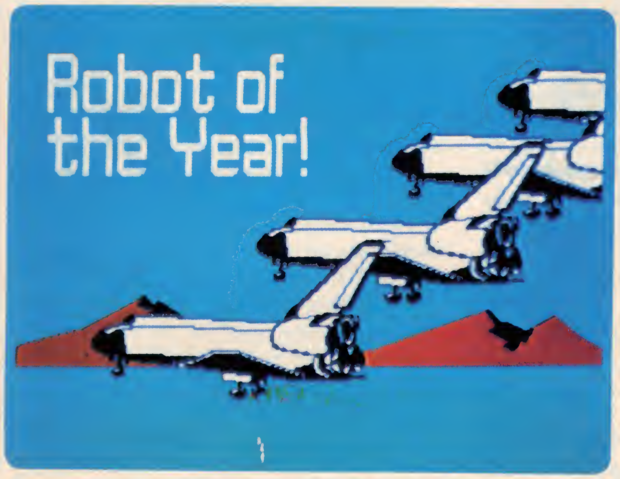


Figure 1. Video animation of the Space Shuttle landing by Jane Veeder.

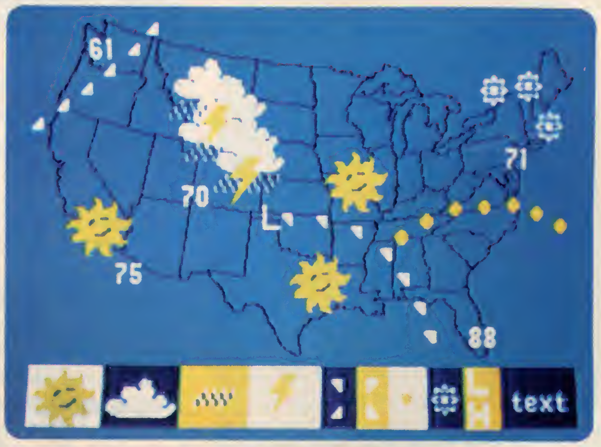


Figure 3. This picture shows a menu-driven program to place weather symbols on a map. This program makes use of the special color filters provided by Zgrass. By Copper Gilroth.

Conclusions

The ability to draw points, lines, boxes, and even circles in color doesn't guarantee fast, easy animated graphics. Now that I have had the opportunity to work with Zgrass and compare it with Basic, I realize that the underlying concepts and language structure are the most important elements for truly easy graphics generation. Zgrass has been a pleasure to use. It is faster and far easier than Basic to learn and implement. Best of all, it gives me access to graphics power that had always seemed elusive before.

For me, the bottom line is cost-effective animation for professional video production. For others, it may be faster paced and more realistic games or more effective computer aided instruction. If your application involves graphics—particularly real-time animation—then Zgrass deserves a good hard look. ☐

Pilot for the Apple

Mike Smith

creative computing
SOFTWARE PROFILE

Name: Apple Pilot

Type: CAI Authoring and Playback

System: Apple II Plus, 48K, Disk Drive (two drives required for authoring)

Format: Machine Language

Summary: Extensive, colorful and interesting

Price: $150.

Manufacturer:
Apple Computer Inc.
10260 Bandley Dr.
Cupertino, CA 94017

In the development of lessons for Computer Assisted Instruction (C.A.I.), the number of things that the instructor needs to do, most of the time, is limited. The three major things are

- Inform the student,
- Accept his response to that information,
- Move to a different part of the lesson depending on whether the student reacted in an expected or an unexpected way.

Everything else is mere "computational detail" and should be performed by the computer.

Now that is rather idealistic. Authoring languages, of which Pilot is an example, attempt to allow the person unfamiliar with those computational details to develop useful and sophisticated courseware for use in the classroom. In addition, such languages can be used to advantage by the person familiar with computers and offer the ability to develop graphics or sound effects to be used in conjunction with programs not written with the authoring language.

The authoring languages on the market achieve the removal of the computational details with varying degrees of success. This review deals with the Apple implementation of Pilot. Although many of the comments are specific to advantages/disadvantages of *Apple Pilot*, I hope that people interested in purchasing other versions, e.g. PET or Atari Pilot, will be helped by knowing what one person feels should be in a Pilot implementation.

The Apple paddles can be used in developing graphics.

In the upcoming issues of *Creative Computing*, I will present an implementation of Pilot that converts Pilot statements into Basic commands. I am very familiar with the language, and therefore feel justified in making certain criticisms of *Apple Pilot*.

I have spent four years as a junior/senior high school teacher in physics and mathematics, and am currently teaching courses in computer engineering at the university level. I am interested in the development of Computer Aided Instruction and in the simulation of various effects in the classroom. My interest in Pilot arose when I found that in order to develop Basic lessons for use in the classroom, I had to spend an exorbitant amount of time.

This development time was in addition to my regular classroom load, and although I had been a programmer for 15 years, I was looking for a method to cut down lesson development time. *Apple Pilot* appeared to be a step in that direction.

Equipment

Apple Pilot comes as a system diskette (uncopyable but with a back-up), a demonstration lesson diskette and two fairly detailed *Apple Pilot* reference books. A student using prepared lessons requires an Apple II Plus with 48K of memory together with a single disk drive. Although not necessary, a color monitor can be used to good effect to display the graphics.

A teacher (lesson author) needs a second disk drive to prepare a lesson. There has been no effort made to enable the teacher with only one drive to develop a lesson. As *Apple Pilot* makes very extensive use of the disk drives, this disadvantage can be a blessing in disguise.

The Apple paddles can be used in developing graphics and to allow the student to interact with the program. However, as all the graphics commands can be implemented from the keyboard, the absence of paddles is not a problem.

A printer can be used to provide a listing of the Pilot program during lesson develop-

Dr. Mike Smith, 304 86th Avenue SE, Calgary, Alberta, Canada T2H 1N7.

ment. Unfortunately, there are no commands to allow a Pilot lesson to use a printer. This is a definite disadvantage as there are many times when students need hard copy information.

Through the use of the graphics screen, both upper and lower case are provided without a lower case adapter. Control-Z acts as a shift key, and Control-A acts as a shift-lock key. The shift key appears not to be implemented. However, connecting the shift key to the game paddle port allows normal typewriter use of the shift key. Shift-p gives P and control-shift-p gives @. No mention of this possibility is made in the manual; it is almost as if the Apple programmers didn't realize that they had included it.

No changes to the files on the Apple diskette are needed to get this modification to work. (Don't try this yourself unless you know eactly what you are doing. Get the dealer to do it so you can use the shift key, keep the use of the game paddles and avoid baked Apple.)

Although the *Apple Pilot* is implemented in part from Apple Pascal, neither knowledge of Pascal nor the Pascal language card is required to use it. However, if you do have access to a language system, you will find that you can perform many functions using the Pascal operating system. With the language system you can use *Apple Pilot* to advantage in customizing character sets, e.g. scientific or foreign language, for use in place of the Pascal SYSTEM.CHAR.

The fact that the *Apple Pilot* makes no use of the language card has both advantages and disadvantages. The most obvious advantage is that you cut the cost of implementing an *Apple Pilot* system by $300 or so per student computer. That is quite a saving on a classroom set of computers.

The major disadvantage is that *Apple Pilot* is rather cramped for memory space. This results in heavy disk drive use and very little space to store variables within a Pilot program. It would be nice if the teacher could at least down load the EDITORs onto the card as this would reduce the time required to reload them to make corrections in the programs.

It is rather annoying that the system diskette is uncopyable. The lesson diskettes can easily be copied. If only the teacher is developing lessons using the system diskette, there is little likelihood of crashing the system diskette, as *Apple Pilot* is written in a very user helpful and protective way.

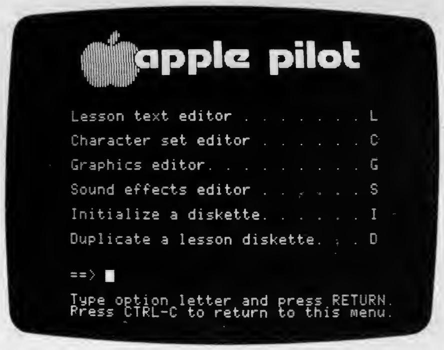
However, Pilot is such a simple language to learn and the Apple implementation of the sound and graphics editors so pleasant to use, that students should be allowed to develop their own programs. Students are frequently very hard on disks and a copyable master disk should be available.

The Pilot System

The *Apple Pilot* system is divided into six parts. The text editor, graphics editor, character editor, sound editor, and lesson duplicator are available only to the courseware developer. The Run-Time system is available to both student and developer.

Developing a Lesson

After booting the system (authoring) disk, the teacher is presented with a menu of editors. After choosing the required editor, a second menu appears. This allows the various types of files to be created, deleted, printed, edited or tested. A maximum of 21 files can be accessed by each of the editors. This might appear to be a serious limitation, but in practice, except for a back-up disk, you would not want a large number of lessons on one disk.



```
apple pilot

Lesson text editor . . . . . . . L
Character set editor . . . . . . C
Graphics editor. . . . . . . . . G
Sound effects editor . . . . . . S
Initialize a diskette. . . . . . I
Duplicate a lesson diskette. . . D

==> █

Type option letter and press RETURN.
Press CTRL-C to return to this menu.
```

An important part of developing a Pilot lesson is designing the lesson on paper before entering the text. The sound and graphics parts of the lesson need not be developed until later; the Run-Time system is able to cope with the absence of these files. This means that the teacher can map out the skeleton of the lesson without worrying about embellishments until much later on.

One big plus with this version of Pilot, is that the courseware developer does not have to be concerned with the formatting of the text on the screen. In Basic programs, you must be sure that words are not split onto two lines. In *Apple Pilot* this is automatically taken care of. Even if you develop a lesson and then decide to cram the text into one half of a screen, using the other half for graphics, all the formatting is done for you.

Once the lesson has been saved on the disk, you can RUN it from the editor. Running the lesson this way has several advantages over testing the program as though you were a student. A student never gets to see the error messages as the Run-Time system inwardly digests them. Running the program from the editor causes all errors to be displayed on the screen. In addition you can more quickly edit the files by recalling the editor into memory at this time. It is a shame that the editors cannot be stored in the language card as this would further reduce the recall time.

In Basic, when your program crashes, you simply retype the offending line and rerun the program. This version of Pilot is a little different. The Pilot program, unlike a Basic program, does not exist in memory. Instead, it resides as a series of commands in a file on the disk. The Run-Time system pulls small portions off the disk and does what is required. This means that you can't just change a line, you must go back and change the file on the disk using the editor. This is the reason that it makes good sense to plan your lessons in advance.

In developing a lesson, you can include a GOTO option which allows you to jump to a certain part of a lesson and test it without having to go through the earlier parts. The secret in good CAI is to test, test and then test again.

Text Editor

Apple Pilot has a fairly comprehensive editor. It allows the addition and deletion of text, moving around inside the file and the replacement or changing of specific character strings. For people unfamiliar with editors or computers, it will take some time to get used to all the commands.

A nice feature is that after making a change, you can type Control-C and recover the original file—useful when you make mistakes. In addition, before you leave the editor, you are asked how you want to save the file. You can save it under either the old name or a new name, or throw it away.

The use of the command tx: allows the character set to be changed. This means that the keyboard can be programmed to type special characters instead of the normal letters. This is very useful for introducing scientific or foreign language symbols into your lessons. However, since the text editor uses the text screen rather than the graphics screen, these new characters are not displayed while you are in the text editor. This is a great shame as it makes animation much more difficult.

Again, because the text editor uses the text screen, all letters are shown in upper case, with the true upper-case letters shown in inverse. The shift key modification mentioned earlier still works. No information on how to incorporate a lower-case adapter is available in the documentation.

If many back-up copies of files are kept, you will quickly have more than 21 text files on a disk. Because of a peculiarity of the editor, you can access only the first 21 access files. The others are safe on the disk, you just can't edit them. If you find yourself in this situation, there are three possible solutions:

Delete unwanted files. A useful solution only if the files are unwanted. A better solution is to have one disk on which you develop a lesson. Then you can transfer the completed lesson. (But when is a lesson ever complete?)

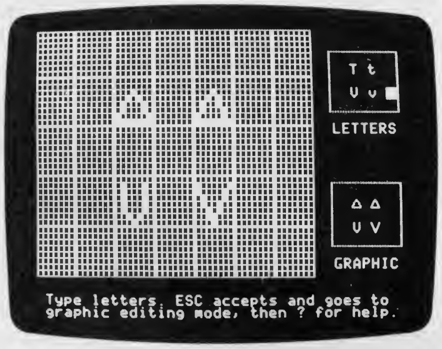
Call early versions of the files into memory and save them under a different name, then delete the old files. This has the effect of putting early files high on the disk. The other files move down the disk into a place where you can access them. This is a useful procedure only if you do it infrequently.

Access the files through a Pascal language card. Users of the language card will recognize the text editor as being similar to the Pascal Text Editor, except in two areas. First, the screen is limited to 40 characters. If you go past 40 characters, the cursor automatically moves down to the next line. That might be a useful option in Pascal. Second, the function of the Control-C and Escape keys in accepting/rejecting text changes are reversed in operation in Pilot compared to Pascal. Whether it is possible to change the Pilot start-up options to alter this is not documented.

Character Editor

The character editor allows the design of special characters.

Upon entering the editor, you will find a screen divided into three areas: a grid of 35 boxes show the character you type on the keyboard and the real-size special character you have developed.



Type letters. ESC accepts and goes to graphic editing mode, then ? for help.

To design a character, you move the cursor around on the grid, using either the keyboard or paddles. Each small grid square represents one pixel of the character.

The character editor was found to be lacking in one area. There is no simple way of "pulling the plug"—erasing a character back to a blank. If you make a mistake, you must erase it dot by dot.

Graphics Editor

Graphics can be entered into a lesson in two ways. They can be called by graphics commands imbedded in the text or as pictures developed by the graphics editor. For graphics more complex than a few simple lines, it is better to use the editor. The other method means that you don't see the effects of the graphics until you run the lesson.

For complex graphics, correcting errors can become very time-consuming. Second, when the lesson is run every time a graphics command is issued, a graphics interpreter is downloaded from the disk into the memory (another place where a language card could be used to advantage). If many graphics commands are entered, this can really slow down the lesson.

The editor itself allows the production of complex figures in a fairly simple way. Once you are familiar with the commands and have developed a plan of attack, the pictures appear very quickly. I like to use the editor to develop "slides" for use in lessons and lectures. A HELP function is included to provide information on-line about the commands.

The editor uses a rubber band cursor. The cursor is placed at a starting part of the screen from which it can be moved by using the paddles and/or keyboard. Connecting the starting point and current cursor position there is a line which stretches and shrinks as the cursor is moved. It is as though there were a rubber band connecting the starting and current points of the cursor. This makes it very easy to position your graphics correctly.

The editor uses a rubber band cursor.

Boxes can be placed on the screen very quickly. Using the rubber band cursor you position the opposite corners of the box, press B and get a box filled with the required color. Pressing F gets you a frame rather than a filled box. Open and closed circles can be produced in a similar way.

Complex shapes can be made by moving the cursor about the screen. Moving the cursor into the middle of a shape and typing A will cause an area to be filled with color.

Typing E causes the last set of graphics commands to be removed and the graphics screen updated. This updating of the graphics should be an option. If you want to remove the last two sets of commands, you must remove one set, wait for the screen to be redrawn, and then erase the second set and wait again. For complex graphics this wait can be very frustrating.

Commands can only be erased from the end back. If you find that something you drew early in the graphic is no longer to your liking, everything drawn after it must go.

Moving the cursor to a point and typing T allows the entry of text on the graphics screen. This is independent of the text placed in the text window by the text editor commands.

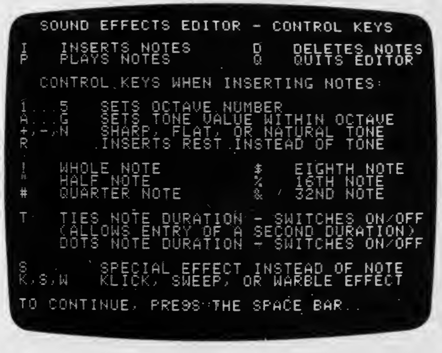
The graphics, once produced, can be stored in two ways. A picture can be stored as a series of commands or as the whole picture (Quick Draw). When the command form is called from a lesson, the picture is redrawn element by element. With a Quick Draw picture, the whole picture appears on the screen at once. The main disadvantage of Quick Draw pictures is the fact that they eat up disk space very quickly, occupying 17-20 blocks on the disk compared to the 1-4 blocks that the command files occupy.

The main problems with the graphics editor are the erasing problem and the fact that there is no way to use a graphics tablet to draw the graphics. I have found a reasonable, although unsatisfactory compromise. I make a drawing of the object on a clear piece of plastic. I then place this in front of the monitor and use the paddles to trace the shape on the screen. It works, but a graphics tablet would be much nicer.

Sound Editor

Sound can be introduced into a lesson by using either sound commands imbedded in the text or the sound editor. Imbedded commands suffer from all the disadvantages mentioned for imbedded graphics commands.

The sound editor has a HELP function to detail the commands available. It permits notes to be produced over a range of four octaves (plus an additional F). Notes can be natural, sharp or flat. The duration of the notes can be changed from a full note down to 1/32, and notes can be tied. Special effects include the production clicks, sweeps or warbles. You can play the music developed from the editor without running a lesson.



```
  SOUND EFFECTS EDITOR - CONTROL KEYS

I    INSERTS NOTES       D   DELETES NOTES
P    PLAYS NOTES         Q   QUITS EDITOR

  CONTROL KEYS WHEN INSERTING NOTES:

1...5   SETS OCTAVE NUMBER
A...G   SETS TONE VALUE WITHIN OCTAVE
+,-,N   SHARP, FLAT, OR NATURAL TONE
R       INSERTS REST INSTEAD OF TONE

!    WHOLE NOTE          $   EIGHTH NOTE
"    HALF NOTE           %   16TH NOTE
#    QUARTER NOTE        &   32ND NOTE

T    TIES NOTE DURATION - SWITCHES ON/OFF
     (ALLOWS ENTRY OF A SECOND DURATION)
     DOTS NOTE DURATION - SWITCHES ON/OFF

S       SPECIAL EFFECT INSTEAD OF NOTE
K,S,W   KLICK, SWEEP, OR WARBLE EFFECT

TO CONTINUE, PRESS THE SPACE BAR..
```

As a science/math teacher, I have not had much need to use this editor other than to produce a few special effects. Whether the editor would be useful in producing lessons for somebody with a more musical bent, I am not qualified to say. However, the following limitations might be important:

The notes are not displayed on the staves but in the form

C 4 1/4 T

which means the note of C in the fourth octave for 1/4 of a note, tied to another note.

You are limited to one note at a time; no chords are allowed. This is rather a shame as even in science it would be nice to demonstrate the effect of two notes beating together.

Features of Apple Pilot

In my upcoming series of tutorials and articles, I will describe the Pilot language. *Apple Pilot* has the equivalent of most of the commands mentioned in those articles. The rest of this review will be devoted to describing the special features of *Apple Pilot*.

The presence of the graphics editor is a real plus. Graphics and special characters can add to the content and interest of a lesson, if used correctly. The documentation provided on Pilot is good. Examples are plentiful and a person unacquainted with the language can prepare satisfactory lessons with the documentation. However, there are no additional references which would enable users to extend their knowledge and application skills.

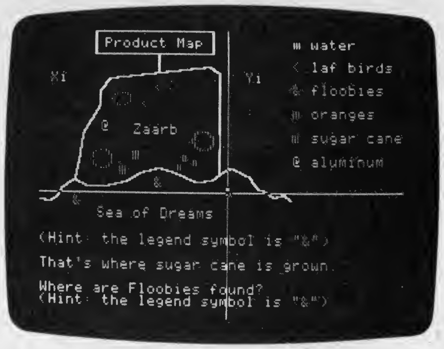
The Accept and Match commands have several useful options. The student answer can be modified automatically to all upper and lower case. Unnecessary blanks can be removed and numbers rescued from within a sentence. For example, the number 5 will be recognized from within "There are 5 things there, computer."

The Match instruction can be made to look for one or several character strings with or without allowing for spelling mistakes. It can be made to distinguish between the "no" in "none" and the "no" in "known" (one starts the word). The number of attempts that a student has made at a certain answer is stored automatically by the program.

In addition, it is possible to preset the time allowed for a student to answer. This permits checking on whether the student needs some help.

A very useful command, ap:, places a series of cross hairs on the screen. The student can move the cross hairs with the paddles to point things out. This feature is nicely demonstrated in the Legends program on the demonstration Lesson diskette. However, if you don't have the paddles connected, you will not see the demonstration.

There are file handling commands included in *Apple Pilot* which can be used to store student responses and scores for later analysis. I have not made much use of these, as I felt that they were rather clumsy. If you were building a large series of lessons and needed to keep track of overall student performance they might be useful.



```
(Hint: the legend symbol is "&")
That's where sugar cane is grown.
Where are Floobies found?
(Hint: the legend symbol is "&")
```

Because of memory restrictions, there is only limited space for storing variables in the program (600 characters including the answer buffer). The names of the variables are limited to one letter and one number. This means that the student name must be stored in a variable of the form N1$ rather than NAME$. This leads to poor programming style.

> ***Your local dealer will know very little about Pilot.***

Assuming that the system needs variables of two characters only, there was no need to restrict the user to those characters. A look-up table would have provided the best of both worlds.

In addition to strings, numerical variables can be manipulated. A number of system variables are kept. These include the last answer, the numerical value of the last answer and the number of times the last question has been attempted. Variables defined in one Pilot lesson can be carried over into the next lesson if required. This is a very useful feature to ensure continuity in a series of lessons.

A very useful compute command, c:, allows mathematical formulae to be calculated. Certain string modifications can be made, including capitalization of a string, capitalization of the first letter, replacement or deletion of characters in a string. Surprisingly, changing a string into lower case is not an allowed function. The calculation power of the Compute function seems rather slow. The production of random numbers for use in a simulation seems to take forever.

In addition, calculations cannot be done via the equivalent of DO-loops. This is probably not a problem for people unfamiliar with computers, but for experienced programmers it is definitely a fustrating disadvantage. IF-THEN loops can be produced but also take a long time to run.

Considering the fact that there are so many user friendly features in this version of Pilot, it is very surprising that it is necessary to define strings before they can be used. Again, this is probably due to memory space restrictions.

The program does its best to recover from errors. If a graphics or sound file is not available, the student lesson continues regardless. The program responds to control-C, reset and fatal errors by rebooting the system HELLO program. There is no way of disabling this feature.

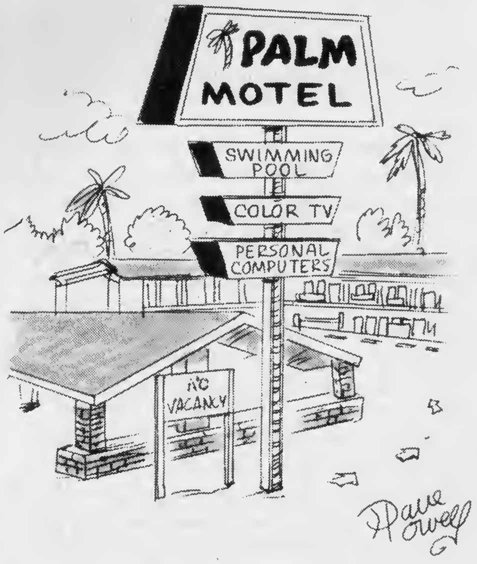
Conclusion

Overall, this is a useful program and can be put to good use by both the experienced and inexperienced courseware developer. There are many useful HELP functions within Pilot, and the program is, in general, very user friendly. Considering the cramped memory, a teacher will be limited by his own imagination, rather than by this implementation of Pilot.

My only real criticisms concern support and documentation. There are no additional references on Pilot and no information at all for the experienced programmer who wants to include parts of Pilot with his lessons to make modifications to the language.

Your local dealer will know very little about Pilot and letters to Apple requesting more information will not even receive a courtesy postcard to say "contact your local dealer and stop bothering us."

Your best bet is to form a group of Pilot users, and share software. And please, if you have useful ideas, write them up and send them to *Creative Computing* so we can all share. Everybody hates re-inventing the wheel. ☐



Apple/UCSD Pascal 1.1: A User's Evaluation

Ross M. Tonkens

creative computing
SOFTWARE PROFILE

Name: UCSD Pascal
Type: Language
System: 48K Apple II+, Apple language card, disk drive with controller.
Format: Disk
Language: Machine
Summary: A truly serious software development system.
Price: $250
Manufacturer:
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014

Having lived with Apple's newly updated version of UCSD Pascal (Pascal Ver. 1.1) for over a month, now, I feel a few observations are in order.

First, let me say that the manuals alone are worth the $60 update cost, for those of us who have had to live with the infamous "White Book" for the last year and a half. Just the sight of a real index (spanning more than seven pages!) brought tears of joy to my eyes.

In fact the system consists of over two manuals and four disks. I say "over two" manuals because there are two full-fledged reference manuals, one for the operating system, and one for Apple's implementation of UCSD Pascal. Both manuals are of the outstanding glossy quality to which we have become accustomed from Apple. I might add in passing that the graphic artwork gracing the covers of the manuals would sell briskly as poster art. In addition, three 9- to 16-page pamphlets are included. One describes differences between the old and new versions of Apple/UCSD Pascal; one is an addendum to the new operating system reference manual; and the third is an addendum to the new Pascal language reference manual.

Perhaps the best features of the current update are found only in these addenda. Among them were EXEC files, chaining capability, built in upper and lower case text generation without hardware add ons, much faster compile times, new compiler options, and an explicit list of previous bugs, fixed in this new version. Also contained in one of these little pamphlets is, at last, a lucid description of how program segmentation is accomplished by the compiler which clears up many mysteries left unresolved by even monk-like study of previous documentation.

This is all fine, but "how well does it wear?" as the saying goes. In short, "very well, indeed." All of the inconsistencies in how the operating system previously handled files with the special suffixes, ".text" and ".code" have been resolved. Combined with the addition of EXEC file capability, this has increased my productivity by at least 100%.

Now the user can define a common sequence of operating system commands, for example, those steps taken to compile and link a UNIT and install it in a library, or the commands issued to compile, link, and run a program, and have the computer perform them automatically in sequence, rather like a job control language. Instead of having to watch the computer full time, I now simply call up an EXEC file and take a break while the boring processes of compilation, linking, and test running all take place unattended.

EXEC files almost make up for my lack of a hard disk drive in terms of the increase in throughput achieved. About the only new problem the changes have created is temporary obsolescence of any memory-sensitive software, since the old memory map on which such software would have been based has been changed. This problem should be only temporary, as the update will involve simply altering the CONSTANT declarations of any Pascal 1.0 program which referenced memory directly once the new memory map is published by Apple. This brings me to my only complaint, namely that the new Pascal 1.1 manual did not already contain this information.

While the new Apple/UCSD Pascal Ver. 1.1 still has its idiosyncrasies, Apple seems to have distilled out those problems which were truly intolerable, while adding numerous conveniences which make it a truly serious software development system at last.

Now if I could just save the money for that hard disk.... ☐

Ross M. Tonkens, M.D., 6221 Wilshire, Suite 607, Los Angeles, CA 90048.

Turtles and Sprites for the 99/4

Betsy Staples

creative computing
SOFTWARE PROFILE

Name: TI Logo
Type: Language
System: TI 99/4 with disk drive and memory expansion unit
Format: Command module with disk
Summary: An educational tool designed to develop problem-solving skills
Price: $299.95
Manufacturer:
Texas Instruments Incorporated
P.O. Box 53
Lubbock, TX 79408

My first inkling that ordinary people could learn to use computers came from a "scholarly paper" about "Turtle Geometry" that crossed my desk at Drew University about five years ago. The title was intriguing, so I read it, even though I knew it had been written by a professor of mathematics, a subject I had striven to avoid since my junior year in high school.

I was shocked to discover that the ideas presented in the paper were not only comprehensible, but quite unmathematical.

Recently, I met Turtle Geometry again on the TI 99/4 computer, and it was even more fascinating, because this time the turtle was at my command in TI Logo.

Developed at M.I.T., Logo is intended to help primary through high school age young people cultivate their problem-solving skills. It has been tested at the Lamplighter School in Dallas, TX, and in the New York City public schools.

Turtle Mode

Let's get back to the turtle. You enter "Turtle Mode" by typing TELL TURTLE. The triangular turtle appears in his home (the center of the screen) and the cursor appears in the lower left-hand corner of the screen.

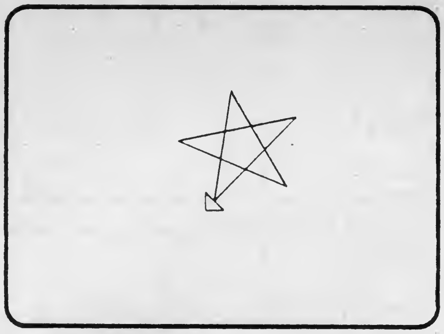
The turtle moves forward or backward. You specify how many "steps" he is to take, and he leaves a line of that length in his wake.

The LEFT and RIGHT commands cause the turtle to turn the number of degrees specified, although the word "degrees" is never mentioned. Thus, the commands RIGHT 90, FORWARD 30 make the turtle turn 90 degrees and draw a line 30 steps long.

If you forget to specify how many steps he is to take or degrees he is to turn, the computer responds with TELL ME MORE. The entire line must then be retyped, including the missing information.

If you make an error in typing the command, "FORWARD 10," for example, the computer says "TELL ME HOW TO . ..." Once again, the entire line must be retyped correctly.

The turtle can't draw forever, and when he reaches the end of his tether, the length of which is never specified, the OUT OF INK message appears, and the screen must be cleared before any more drawing can be done.



```
CLEARSCREEN
FORWARD 50
RIGHT 144
FORWARD 50
RIGHT 144
FORWARD 50
RIGHT 144
FORWARD 50
RIGHT 144
FORWARD 50
```

Figure 1. The turtle draws a star.

Additional commands include PENUP, PENDOWN and PENERASE, which are self-explanatory, and PENREVERSE, which allows the turtle to erase a line he has crossed and draw a new one.

It takes a bit of practice to get the turtle's trail to intersect exactly where you want it when drawing complex shapes, but if you pay attention, you learn something each time you fail.

Shape	Design
PLANE	
TRUCK	
ROCKET	
BALL	
BOX	

Figure 2. The five basic shapes.

Sprites and Shapes

"What is a sprite? It's an invisible thing you can talk to. You must tell a sprite about itself before you can use it."

The things that a sprite can be told about itself include: shape, color, speed and heading. There are five shapes—plane, truck, rocket, ball and box—built into the language, and an alleged 16 colors, many of which are indistinguishable from others—purple and blue, for example, were identical on my monitor. You can talk to 32 sprites at a time by giving them numbers.

The following sequence:

```
TELL SPRITE 1
CARRY :TRUCK
SETCOLOR :GREEN
SETSPEED 60
SETHEADING 90
```

defines Sprite 1 as a green truck which is, at present, moving at a speed of 60 parallel with the bottom of the screen. To make the truck change course and move perpendicular to its current path, you would simply type SETHEADING 0.

Sprites can also be commanded to FREEZE, THAW and move to the center of the screen (HOME). And like the turtle, they can move FORWARD and BACK, and have their headings adjusted with RIGHT and LEFT commands.

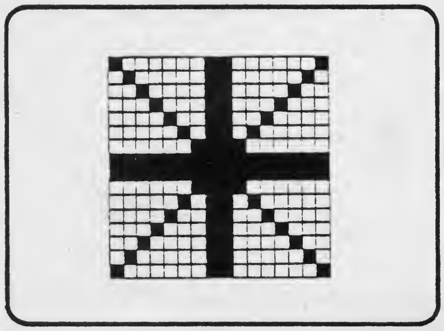


Figure 3. A new shape can be created using the MAKESHAPE command.

When you tire of the five standard shapes, you can design your own using the MAKESHAPE command. Typing MAKESHAPE causes a 16 x 16 grid to appear on the screen, and by moving the cursor around on the grid, you can fill in the blocks that will create the shape you want. The shapes you make can be treated as sprites.

Tiles and Characters

The manual lists "code numbers" for 64 of the 96 characters available on the 99/4. Using the MAKECHAR command, you can modify them at will.

The grids that are used to create new shapes and characters are the "tiles" of which the entire screen is composed. There are 32 columns and 24 rows, and by specifying a character number, column number and row number you can position a character on the screen.

You can also change the colors of the tiles, as well as the background color of the screen.

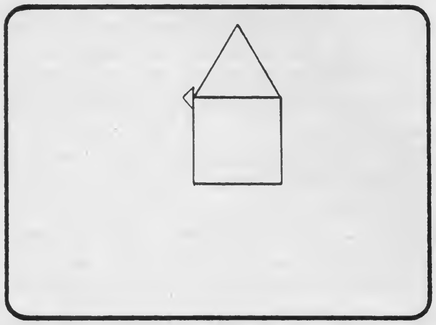


Figure 4. The BOX and TRIANGLE procedures are combined to draw a house.

Teaching Mode

Now that you have mastered the basics, you are ready for some serious programming. The Logo manual, however, never refers to "programs" or "programming." All work done in Logo is accomplished through "procedures."

The first procedure described tells the turtle how to draw a box. "You teach the computer a procedure by typing TO and the name of the procedure." When you type TO BOX, the screen turns green and you are ready to teach the computer how to draw a box.

After you have created the procedure called BOX, you have only to type:

```
TELL TURTLE
BOX
```

and the turtle will draw a box.

Procedures can be combined and linked to one another with individual commands as in Figure 4.

In Sprite Mode, procedures can be written using sprites, tiles and background colors. One of the sample procedures in the manual creates four trees using the rocket and ball shapes, moves them off HOME so they are all visible, and changes the color of the tops in sequence to simulate the change of seasons. See Figure 5.

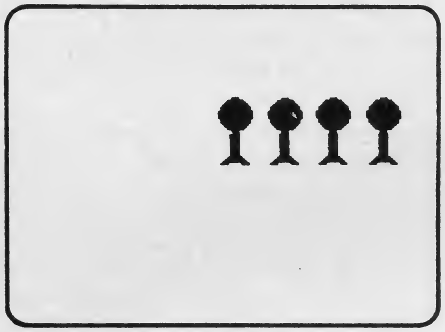


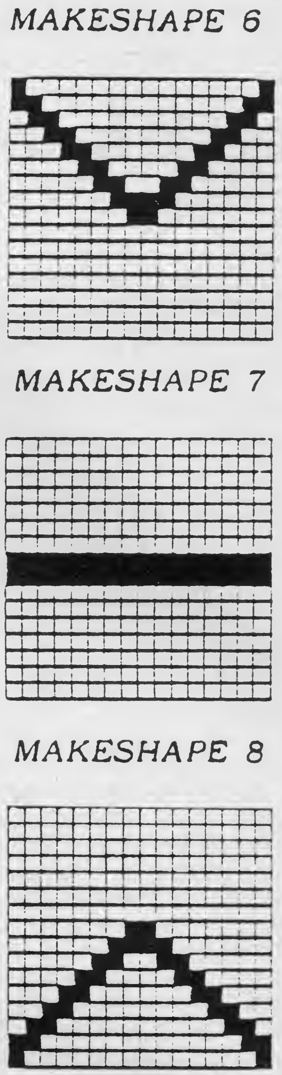
Figure 5. SEASONS: An advanced procedure.

The section of the manual titled "More Advanced Procedures" describes the use of subprocedures, the REPEAT command, variables, the TEST command, IF... THEN...ELSE, and recursion.

Using these advanced procedures, you are able, by the end of the manual, to create a reasonable-looking explosion and a decent approximation of a flying bird. (Figure 6.)

Documentation

In the introductory chapter, several special function keys are described. A very thorough description of the "erase" key is given, for example, but when I looked for the key on my computer, it was nowhere to be found. After some experimentation, I figured out that shift-T was the equivalent of "erase" on my computer.



```
TO FLAP
CARRY 6
WAIT 10
CARRY 7
WAIT 10
CARRY 8
WAIT 10
FLAP
END

TO BIRD
TELL SPRITE 1
SETCOLOR HED
SETSPEED 5
SETHEADING 45
FLAP
END
```

Figure 6. Recursion is used to make a bird fly.

After repeating this procedure for several other keys, I stumbled on the "Quick Reference Guide" hiding on page vi between the Table of Contents and the "Setting Up" section of the manual. There was no explicit explanation of the alternate keys, but given the information I had already acquired through trial and error, I was able to make sense out of it.

This seems a rather careless treatment of a problem that could be quite confusing to a child or an inexperienced teacher. And even though newer versions of the computer undoubtedly have the required keys, TI should have included the alternate combinations in the text for the convenience of users with older models.

Another minor annoyance was the reference in the documentation to the colon, ":" as "dots." For example, "Never type dots in front of a number." The symbol has a perfectly good English name, and I see no reason not to introduce it properly. The semicolon fares somewhat better. It is referred to as ";". You don't learn its real name, but at least it is spared the indignity of being called "dot-comma." Perhaps TI felt "comma" was too complex a word for children to understand.

With the exceptions mentioned above, the manual is clear and complete with plenty of screen diagrams to show what each procedure ought to be produce. It is written in a slightly condescending style, obviously intended to appeal to children working independently; it probably does.

Summary

Logo is definitely fun. It gives you a sense of satisfaction very early in the learning process by providing instant feedback. The sample procedures are short and simple, and you can see at once if you have made a mistake. If you have done everything correctly, you get immediate positive reinforcement which heightens your desire to move on.

The structure of the course, as set forth in the manual, is modular. One short explanation and an example—drawing a box, for instance—could be an entire lesson for a young child or part of a longer session for a high school student.

The complete TI Logo setup requires the software (command module and disk), the 99/4 computer and monitor, disk drive, disk controller, and memory expansion unit. The suggested price for the software is $299.95. ☐

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The Sleeping Giant Stirs

Owen Linderholm

creative computing

SOFTWARE PROFILE

Name: Extended Basic
Type: Language
System: TI 99/4
Format: Module
Language: Machine
Summary: Worth every penny
Price: $99.95
Manufacturer:
Texas Instruments, Inc.
P.O. Box 53
Lubbock, TX 79408

Until now the capabilities of the TI 99/4 have been severely limited because the Basic supplied with the machine was not as useful as that supplied with many other machines. Many of its shortcomings still remain, but for certain applications, the TI has become a computer that not only equals but often outdoes its rivals. The old Basic was extremely slow and did not make good use of many of the features of the computer.

Arrays were limited to three dimensions, multiple statement lines were impossible, graphics handling was possible but difficult, and many commands considered standard on other computers were either absent or available only in a limited form. While some of these problems remain, others have been solved and a few new commands never dreamt of have been added.

The new Basic comes (in it's preliminary form) as a black box, about half the size of a disk drive, which plugs into the ROM socket on the front of the computer. It costs approximately $100 and is worth every penny.

Some of the more advanced features include subroutines which operate exactly like Fortran subroutines, graphics which operate independently of program control and a Basic which does most of the things we have come to expect from Microsoft Basic.

The manual that comes with the Basic seems to include everything in the "User's Reference Guide," plus descriptions of the new commands. It lists near the beginning all the changes that take place when the new ROM is plugged in. There is a long list of new instructions, functions and commands. Also, at the end are mentioned the disadvantages that accompany the new Basic. These include a loss of 864 bytes, a loss of 16 user programmable characters and the inability of some TI Basic programs to run in TI Extended Basic. So far I have not been able to find anything else. Graphics buffs who think that the loss of 16 programmable characters is serious are advised to reserve judgement.

Taking some of the less exciting features of the Basic first, I will look at the ACCEPT statement. This is a very advanced form of the INPUT statement and allows you to specify input fields anywhere on the screen, clear the screen before input, beep, put default values in the input field and verify that the data input is of the type required, all in one statement. The DISPLAY statement has been improved to allow one to do most of these things with output.

Other improvements are: multiple statement lines, with :: as the separator; the inclusion of the command RUN as a program statement; IF-THEN-ELSE constructions improved to Microsoft standard; MAX and MIN functions; a predefined constant pi (guess what?!); improved error handling, including the ability to read protect a Basic program using a Basic command; read protection for disk files; and a few other changes or improvements of somewhat lesser importance.

We now come to the goodies. Leaving the best for last (always a good policy), the next thing to look at is the formation of what TI calls subprograms, subroutines that can be called with a parameter list exactly like Fortran subroutines. Suppose we decide to have a subprogram called TEST which multiplies two numbers together, adds one of the numbers to the result and then prints it. This can be done in ordinary basic by saying:

```
10 DEFFNA(X,Y)=X*Y+X
20 INPUT A,B
30 Z=FNA(A,B)
40 PRINT Z
```

but this is not a subroutine and it never can be in ordinary Basic, since it will only work on the variables A and B. In TI Extended Basic this can be done with:

```
10 INPUT A,B
20 CALL TEST(A,B)
30 GOTO 10
40 END
50 SUB TEST(X,Y)
60 PRINT X*Y+X
```

70 SUBEND

This works, and if you don't understand the usefulness of this facility, just consider the fact that A or B could be replaced by *any* variable. The same result could be achieved another way.

10 INPUT A,B
20 CALL TEST (A,B,C,)
30 PRINT C
40 GOTO 10
50 END
60 SUB TEST(X,Y,Z)
70 Z=X*Y+X
80 SUBEND

In this version, the variable Z can be used in the main program as well. A subprogram can be as long as you wish consistent with the memory available. As you can see, this is an *extremely* useful feature of the Basic.

Another of the more interesting features of the machine is its ability to speak using the plug-in speech synthesizer module. In the ordinary Basic, speech synthesis requires an extra ROM. With the new Basic the computer can be given a vocabulary of approximately 300 words which allow you to make limited phrases. The manual also mentions creating your own vocabulary but does not tell you how to do this. Nevertheless certain of my colleagues have managed to produce some unusual sentences.

The most interesting feature of the new Basic is the use it makes of the graphic capabilities of the TI 99/4. These are phenomenal, and it is surprising that the machine has not made better use of them up to now.

The single option I found most amazing is that once a graphics character called a "sprite" has been set up, it will continue to move in a specified direction on the screen while the computer does something else like calculating the square roots of the first 100 prime numbers. The "sprite" itself can be made up of either one or four characters which can be defined by you or be part of the standard character set of the computer. For instance,

10 CALL CLEAR
20 CALL SPRITE (#1,79,14,1,1,5,5)
30 GOTO 30

will clear the screen and set a magenta colored "0" moving diagonally across the screen very slowly. If the program is not interrupted, it will *never* stop! This may not seem terribly exciting, but consider the fact that the program is doing nothing to the character; it is only executing the loop 30 GOTO 30. Line 10 of this program clears the screen, line 20 sets up the figure as character 79 (an 0) with color 14 (magenta), starting point (1,1) (the top left corner of the screen), and velocity (5,5) (5 units in the x-direction and 5 units in the y-direction per unit time). As you can see, all the graphics routines are performed by subprograms built into the machine.

Up to 28 of these "sprites" can be created and used at one time. They can be defined in any shape you wish that can fit into an 8 by 8 format. This is done by creating a shape table in a string, which is easily done, and then using the CALL CHAR command to define the shape. I will include an example later. Once the character is defined, it can be used simply as a character or as a "sprite" as you wish.

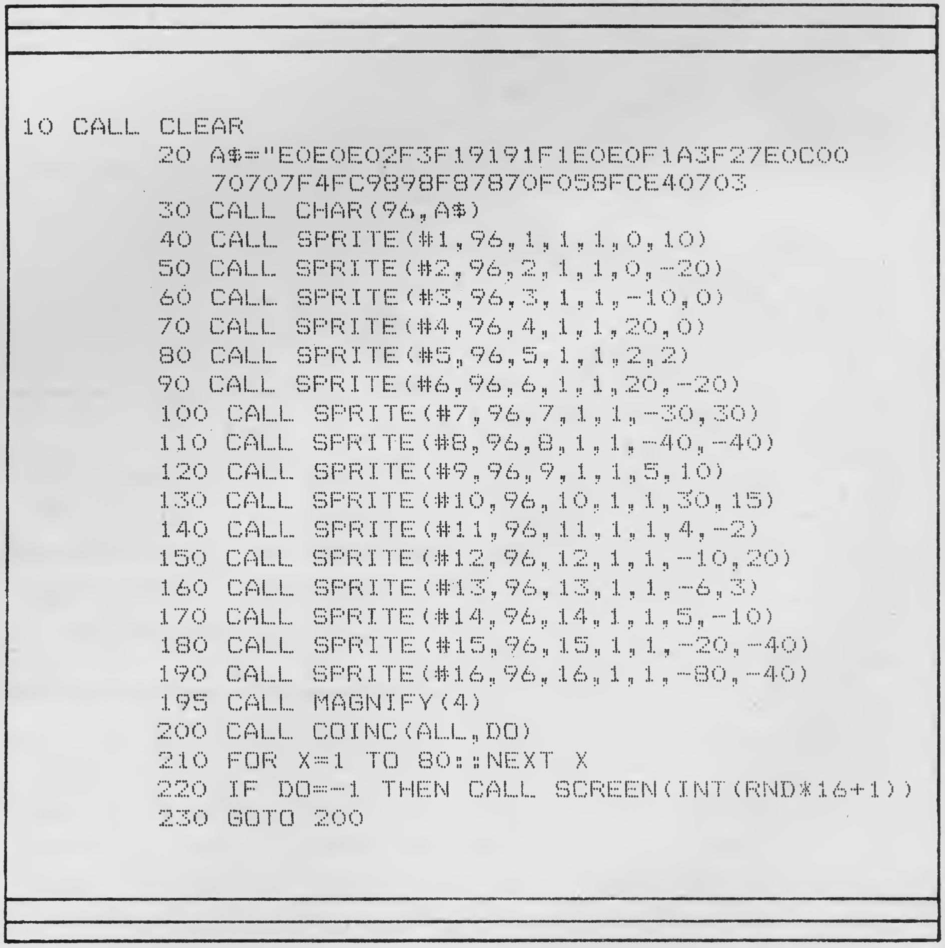
After a "sprite" is created several things can be done to it. You can enlarge it, change its color, change its position, change its motion, discover if it has run into another "sprite" on the screen, find out where it is and find its distance from a point on the screen or from another "sprite." These are all done with simple CALLs. Everything is explained fully in the manual and it doesn't take long to create some pretty nifty graphics.

A sample program that draws 16 detailed skulls and crossbones on the screen, each about three centimeters across, and then moves them all about, changing screen color whenever one meets another, is given in Figure 1 to show how easy it can be. Incidentally, the background to a "sprite" can be made transparent, so when one crosses another you can see it pass over or under the other.

Line 10 clears the screen, then line 20 and line 30 set up the skull and crossbones shape. The next 16 lines set up the actual figures on the screen. Line 195 magnifies the figures so that they take up the space that 16 ordinary characters would. Then the last few lines check for a meeting between the figures and if there is one the screen color is switched to a random color and the sequence is continued until interrupted.

This is only a simple demonstration of the power of the graphics commands. It uses only one shape and ignores many of the built-in functions, but it serves to show what can be done.

With the addition of Extended Basic, the 99/4 still lacks some very useful features, like machine code, which is still practically unavailable, but it seems that TI has finally begun to exploit the potential of its personal computer. ☐



```
10 CALL CLEAR
        20 A$="E0E0E02F3F19191F1E0E0F1A3F27E0C00
           70707F4FC9898F87870F058FCE40703
        30 CALL CHAR(96,A$)
        40 CALL SPRITE(#1,96,1,1,1,0,10)
        50 CALL SPRITE(#2,96,2,1,1,0,-20)
        60 CALL SPRITE(#3,96,3,1,1,-10,0)
        70 CALL SPRITE(#4,96,4,1,1,20,0)
        80 CALL SPRITE(#5,96,5,1,1,2,2)
        90 CALL SPRITE(#6,96,6,1,1,20,-20)
        100 CALL SPRITE(#7,96,7,1,1,-30,30)
        110 CALL SPRITE(#8,96,8,1,1,-40,-40)
        120 CALL SPRITE(#9,96,9,1,1,5,10)
        130 CALL SPRITE(#10,96,10,1,1,30,15)
        140 CALL SPRITE(#11,96,11,1,1,4,-2)
        150 CALL SPRITE(#12,96,12,1,1,-10,20)
        160 CALL SPRITE(#13,96,13,1,1,-6,3)
        170 CALL SPRITE(#14,96,14,1,1,5,-10)
        180 CALL SPRITE(#15,96,15,1,1,-20,-40)
        190 CALL SPRITE(#16,96,16,1,1,-80,-40)
        195 CALL MAGNIFY(4)
        200 CALL COINC(ALL,DO)
        210 FOR X=1 TO 80::NEXT X
        220 IF DO=-1 THEN CALL SCREEN(INT(RND*16+1))
        230 GOTO 200
```

Spicing Up Applesoft

David Lubar

creative computing

SOFTWARE PROFILE

Name: Apple Spice
Type: Basic extension
System: 32 or 48K Apple with Applesoft, Disk Drive
Format: Disk
Language: Machine Language
Summary: Powerful extension for Applesoft
Price: $29.95
Manufacturer:
Adventure International
Box 3435
Longwood, FL 32750

No Basic is perfect, especially the one you own. There is always a missing function that would make life easier or a weak point that increases the work of programming. In the case of Applesoft, the most obvious omission is that of PRINT USING, which formats numeric output. *Apple Spice* gives Applesoft PRINT USING, along with substring search, IF...THEN...ELSE structure, and special input and output routines. This is good news for anyone doing business or game programs in Basic. Each addition is both powerful and easy to use, and all are transparent to regular Basic.

Please Remit $12.11995

The PRINT USING routine allows programs to produce formatted numbers. At the simplest level, this means a number can be limited to a specific length after the decimal. For example, dollar values can be printed with only two decimal places. But that's just the start. The format can be part of a string, allowing the printed number to be within a statement such as "YOU OWE $225.84 AND MUST PAY IMMEDIATELY." Additionally, commas can be imbedded within numbers, and a floating dollar sign is allowed. This feature is accessed with an ampersand command, and the print fields are marked with # signs.

If a decimal extends beyond the required range, the program will round off the number. All numbers are right justified, and can be easily printed in rows or columns. If a number extends beyond the field to the left, an overflow will be printed. While precision is still limited to nine digits, longer numbers can be formatted to represent any number within the range available to the Apple. Considering that it is an add on, the PRINT USING is very easy to include in programs, and rather versatile.

Strung In

It is not surprising that a company known for adventure games would provide a substring search capability. This utility reports the location of any one string within another. To take a trivial example, if one string contains the alphabet, and you are searching for the string "D," the return value would be 4. Since the string searched for can be a word or phrase, the adventure applications are obvious.

It is not surprising that a company known for adventure games would provide a substring search capability.

Adding to the power of the routine, a search can be made for multiple strings, with the value returned for the first match. As an example, an input could be searched for HI, HELLO, HOWDY, etc., and if the function returned a value other than zero, one of the above would have been found. The search is implemented with the USR function, and the argument can be either a literal or a string variable. This capability could be put to good use in almost any form of interactive programming.

Logical Decision

Adding to the logical power of the Apple, an IF...THEN...ELSE structure is provided, with multiple lines allowed. This is in the form of a program module, starting with &IF, followed by the condition. After the condition comes the normal THEN statements which will be followed if the condition is true. Next comes an OR, followed by the ELSE conditions. These are enacted when the condition is false. Finally, the whole structure is completed with an END IF which signals the series is over. While the structure can be duplicated in Applesoft, using some spaghetti code and a lot of GOTO statements, the IF...THEN...ELSE makes life much easier, and makes programs easier to read. Adding to the power, nested statements can be constructed.

Spicing on the Cake

Besides extending Basic, this set of utilities offers input and output routines. The output routine prevents words from being broken at the end of a line, and prompts for a return when the screen is full. Again, adventure writers will immediately see the value of such utilities. But there are also many other applications. In general, anything that puts text on the screen can benefit from formatted output. The input routines allow input of commas and other restricted characters, and screening out of unwanted characters.

Topping it Off

All the routines can be relocated, using a special relocator included in the package. And many special features and default values can be easily changed. The manual covers this all in a readable fashion, and includes many sample programs. The routines are in machine language and execute rapidly. Any serious Basic programmer should take a close look at *Apple Spice.* ☐

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Authoring Systems for the Apple

David Lubar

Recognizing that many teachers aren't satisfied with the limited flexibility of many of the available software packages, and that most teachers don't have time to develop their own programs, several companies have produced authoring systems. This is a rather fascinating concept; the programs are designed to write programs. We recently received four authoring systems for the Apple. The crucial factors in evaluating them were ease of use, flexibility, and quality of the end product. On these and other criteria, the programs ranged from good to abominable.

creative computing
SOFTWARE PROFILE

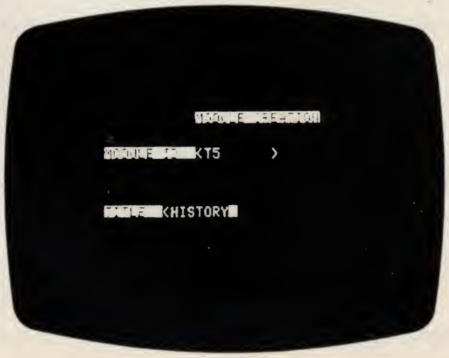
Name: Zenith Education System
Type: Authoring System
System: 48K Apple, Applesoft, Disk drive
Format: 3 Disks
Language: Basic
Summary: Complex, but versatile
Price: $250
Manufacturer:

Avant-Garde Creations
P.O. Box 30160
Eugene, OR 97403

Zenith Educational System

The Zenith Educational System (no relation to Heath/Zenith), is highly flexible but, as a result of this, complicated to use. In essence, the user builds lessons from modules, combining text pages, graphs, and graphics. For each question in a test, up to four possible answers are allowed. In other words the teacher can enter a question such as "If you had three pencils and gave two away and lost one, how many would you have?" and enter as correct answers "0," "zero," "none," and "nothing." Graphics can be tied into any frame of a lesson, and animated sequences can be set up, adding life to lessons. The program also allows the teacher to enter a hint for each question, and a response for correct answers.

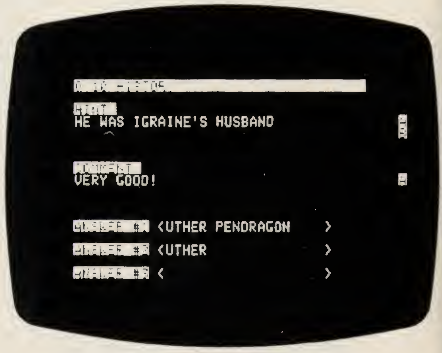
Another feature of the Z.E.S. system is revision questions. These are inserted between regular questions, and are only asked if the student fails on the regular question. Incorrect answers to revision questions cause the program to print a message telling the student to call the teacher. The teacher has the option to continue or terminate the session. There are also automatic questions which are similar to revision questions except that they don't cause the program to halt.



```
                    [illegible]

[illegible] <T5          >


[illegible] <HISTORY
```



```
[illegible]

[illegible]
HE WAS IGRAINE'S HUSBAND


[illegible]
VERY GOOD!


[illegible] <UTHER PENDRAGON    >
[illegible] <UTHER              >
[illegible] <                   >
```

The graphics disk contains a selection of pre-defined shapes, and a program for creating shapes. Once shapes are created, they can be used in frames of the lesson. As a bonus, the flip side of the graphics disk contains a program that quickly initializes multi-boot disks.

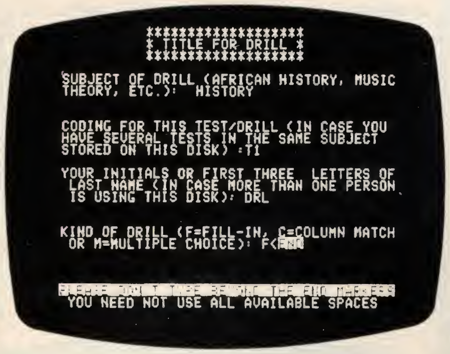
The Z.E.S. system also keeps student records that contain such information as number of questions attempted, number correct, and time taken to answer each question.

As mentioned, there is a price for this flexibility. The user can't just sit down and create a lesson. Modules have to be designed part by part. Different disks are required for creating text and graphics. The user must cope with a program disk, a module disk, and a graphics disk, doing a fair amount of disk swapping during the creation of a program. Even if the user has a dual-drive system, he must still use drive one for almost everything.

In essence, the Z.E.S. system allows teachers to create useful programs, but demands planning and effort on the part of the teacher/author.

The Learning Lab

The Learning Lab allows the creation of fill-in, column matching, and multiple-choice tests. The teacher can also create compositions which can be linked to tests.



```
*********************
* TITLE FOR DRILL *
*********************

SUBJECT OF DRILL (AFRICAN HISTORY, MUSIC
THEORY, ETC.):  HISTORY

CODING FOR THIS TEST/DRILL (IN CASE YOU
HAVE SEVERAL TESTS IN THE SAME SUBJECT
STORED ON THIS DISK) :T1

YOUR INITIALS OR FIRST THREE  LETTERS OF
 LAST NAME (IN CASE MORE THAN ONE PERSON
 IS USING THIS DISK): DRL

KIND OF DRILL (F=FILL-IN, C=COLUMN MATCH
 OR M=MULTIPLE CHOICE): F<END

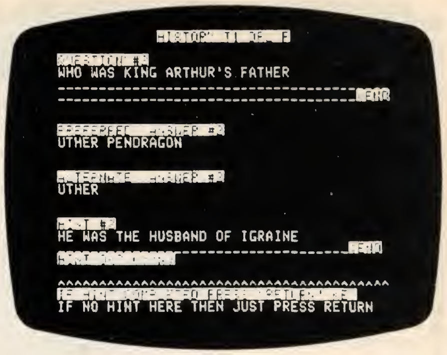
PLEASE DON'T TYPE BEYOND THE END MARKERS
 YOU NEED NOT USE ALL AVAILABLE SPACES
```

These compositions are used to provide background on the questions in the test. This system also uses several disks, but takes advantage of a second drive if present. The Master Disk is the entry point for creating tests and viewing student scores. Tests are stored on another disk, and student records kept on a third.

The fill-in test format allows a question, a preferred and alternate answer, and one hint. Column-matching allows ten pairs of phrases and two unmatched phrases for padding out the answer column. Multiple choice allows five answers, the fourth and fifth of which can be "all of the above" and "none of the above."

creative computing
SOFTWARE PROFILE

Name: The Learning Lab
Type: Authoring System
System: 48K Apple, Applesoft, Disk Drive
Format: 2 Disks
Language: Basic
Summary: Constructs fill-in, multiple-choice, and column-matching tests.
Price: $150
Manufacturer:
Micro Lab
2310 Skokie Valley Rd.
Highland Park, IL 60035



```
HISTORY  T1  DRL  F

QUESTION #1
WHO WAS KING ARTHUR'S FATHER
--------------------------------------END
--------------------------------------END

PREFERRED  ANSWER #1
UTHER PENDRAGON

ALTERNATE  ANSWER #1
UTHER

HINT #1
HE WAS THE HUSBAND OF IGRAINE
[illegible]-------------------------END

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
[illegible]
IF NO HINT HERE THEN JUST PRESS RETURN
```

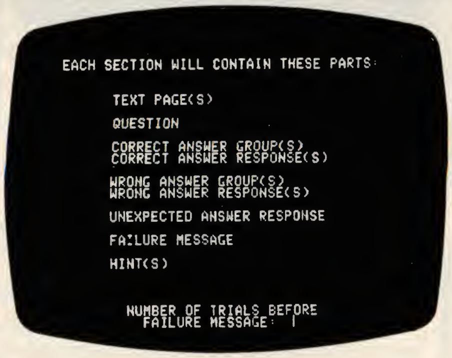
Once a test is created, the student can take it in either test or instruction mode. The instruction mode first presents a composition, if one exists for this test, then gives the student several chances to answer the questions, greeting right and wrong answers with canned comments. These comments may not appeal to everyone, but they are part of the program and cannot be changed.

The Learning Lab keeps track of student scores, storing the information on a separate disk. It can also give the teacher statistics about a test, such as the number of times a test was taken, the average score, and the number of questions in the test.

There seems to be one slight bug in the tests. The one we created crashed if the student hit the right arrow followed by return; perhaps the error traps need a bit of work. Aside from this problem and the canned comments, *The Learning Lab* could be fairly useful in a classroom.

Bell & Howell Courseware Development System

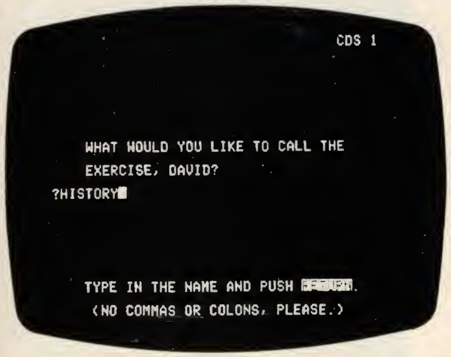
Courseware Development System I was the easiest system to use and, though fairly fixed in the format of tests, allowed a surprising amount of flexibility. The system could be used with almost no reference to the documentation. The system is on



```
EACH SECTION WILL CONTAIN THESE PARTS:

     TEXT PAGE(S)
     QUESTION
     CORRECT ANSWER GROUP(S)
     CORRECT ANSWER RESPONSE(S)
     WRONG ANSWER GROUP(S)
     WRONG ANSWER RESPONSE(S)
     UNEXPECTED ANSWER RESPONSE
     FAILURE MESSAGE
     HINT(S)

       NUMBER OF TRIALS BEFORE
        FAILURE MESSAGE:  1
```



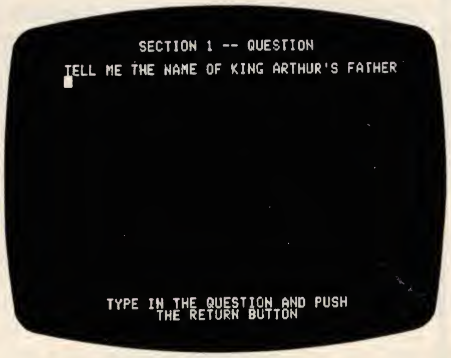
```
                            CDS 1




   WHAT WOULD YOU LIKE TO CALL THE
   EXERCISE, DAVID?
?HISTORY



   TYPE IN THE NAME AND PUSH RETURN.
    (NO COMMAS OR COLONS, PLEASE.)
```



```
        SECTION 1 -- QUESTION
TELL ME THE NAME OF KING ARTHUR'S FATHER








    TYPE IN THE QUESTION AND PUSH
          THE RETURN BUTTON
```

creative computing
SOFTWARE PROFILE

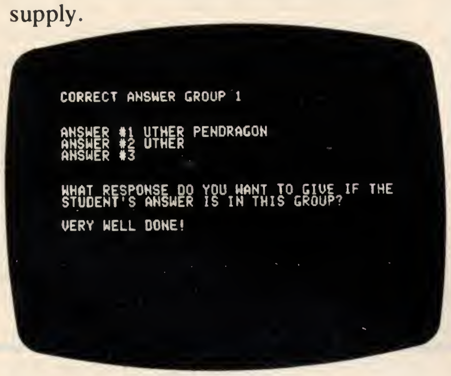
Name: Courseware Development Systems I
Type: Authoring System
System: 48K Bell & Howell computer or Apple with Applesoft, Disk Drive
Format: Disk

Language: Basic
Summary: Easy to use
Price: $300

Manufacturer:
Bell & Howell
Audio-Visual Division
Dept. 8876, 7100 McCormick Rd.
Chicago, IL 60645

Authoring Systems, continued...

one disk, and tests are stored on other disks. Each exercise is made up of units that begin with one or more text pages. The teacher doesn't have to worry about formatting the text; wraparound is automatically avoided during presentation of the test. The text pages, which are optional, can contain background information, lessons, or whatever else the teacher desires. Next comes the question, followed by the first correct-answer group. There can be several correct-answer groups. For each group, the teacher can specify a response to be given if the answer given by the student matches a member of the group. Next, the teacher can specify one or more wrong-answer groups. Again, responses can be entered for when the student matches a member of the group. This could be very useful for questions that many students are likely to answer with specific incorrect replies. The system next asks for a comment to be given for unexpected answers, a message in case the student fails to answer the question, and for any hints the teacher wishes to supply.



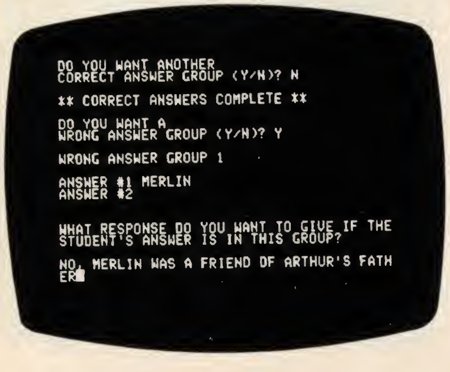
```
CORRECT ANSWER GROUP 1

ANSWER #1 UTHER PENDRAGON
ANSWER #2 UTHER
ANSWER #3

WHAT RESPONSE DO YOU WANT TO GIVE IF THE
STUDENT'S ANSWER IS IN THIS GROUP?

VERY WELL DONE!
```

This process continues for as many units as the teacher requires. The test is now ready to use. Earlier, at creation time, the teacher specifies how many incorrect answers should be allowed before the program presents the failure message. Now the teacher has the option of opening the test to all students or creating a roster. If a roster is used, student records are kept. The records show the student's scores for a test, and the aggregate results for each question in an exercise.



```
DO YOU WANT ANOTHER
CORRECT ANSWER GROUP (Y/N)? N

** CORRECT ANSWERS COMPLETE **

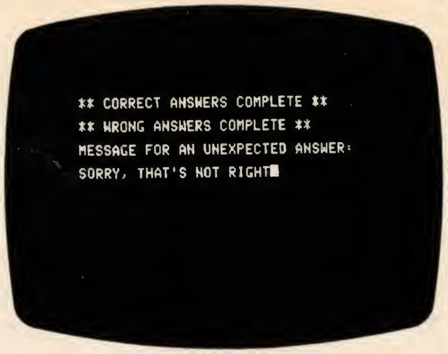
DO YOU WANT A
WRONG ANSWER GROUP (Y/N)? Y

WRONG ANSWER GROUP 1

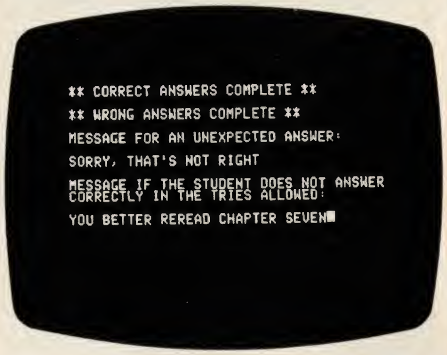
ANSWER #1 MERLIN
ANSWER #2

WHAT RESPONSE DO YOU WANT TO GIVE IF THE
STUDENT'S ANSWER IS IN THIS GROUP?

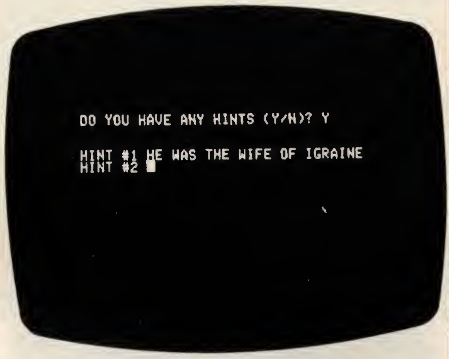
NO, MERLIN WAS A FRIEND OF ARTHUR'S FATH
ER█
```



```
** CORRECT ANSWERS COMPLETE **
** WRONG ANSWERS COMPLETE **
MESSAGE FOR AN UNEXPECTED ANSWER:
SORRY, THAT'S NOT RIGHT█
```



```
** CORRECT ANSWERS COMPLETE **
** WRONG ANSWERS COMPLETE **
MESSAGE FOR AN UNEXPECTED ANSWER:
SORRY, THAT'S NOT RIGHT
MESSAGE IF THE STUDENT DOES NOT ANSWER
CORRECTLY IN THE TRIES ALLOWED:
YOU BETTER REREAD CHAPTER SEVEN█
```



```
DO YOU HAVE ANY HINTS (Y/N)? Y

HINT #1 HE WAS THE WIFE OF IGRAINE
HINT #2 █
```

CDS I earns high marks. As mentioned, it was easy to use, and flexible. By using various combinations of the available entry options, a teacher could produce a good lesson disk.

Eureka Learning System

In an attempt to produce a flexible system, the *Eureka Learning System* forces users into a syntax with all the charm and grace of Cobol. Test material is entered in a bizarre fashion in which the teacher must deal with entities and attributes, producing input that resembles code. This is just a part of the problem. These entities and attributes are organized into sentences, using a numbering system. The entry by the teacher at this point resembles an alphanumeric cryptogram. The end result of all this is that sentences can be presented in various ways with varying syntax. Once the teacher manages to create a quiz, it can be presented in several modes. The Practice mode allows one chance, then supplies the correct answer if the student is wrong. No hint or reinforcement is available. The Evaluate mode presents the questions as a test.

The program allows for graphics and hi-res fonts. No shape utility is provided. Instead, the documentation suggests that the teacher should buy one of the commercially available programs for creating shape tables. This is but one of the absurdities and problems in this package. Rarely have we seen software that has no redeeming qualities. Unfortunately, this is one case where there is nothing good to say. To put it bluntly, we cannot recommend this program to anyone.

creative computing
SOFTWARE PROFILE

Name: Eureka Learning System

Type: Authoring System

System: 32K Apple, Applesoft,
cassette or disk

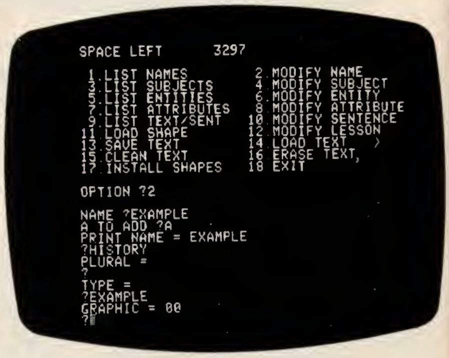
Format: Tape or Disk

Language: Basic

Summary: Not very good

Price: $495.

Manufacturer:
The Programmers Inc.
P.O. Box 1207
Taos, NM 87571



```
SPACE LEFT      3297

 1.LIST NAMES          2.MODIFY NAME
 3.LIST SUBJECTS       4.MODIFY SUBJECT
 5.LIST ENTITIES       6.MODIFY ENTITY
 7.LIST ATTRIBUTES     8.MODIFY ATTRIBUTE
 9.LIST TEXT/SENT     10.MODIFY SENTENCE
11.LOAD SHAPE         12.MODIFY LESSON
13.SAVE TEXT          14.LOAD TEXT    >
15.CLEAN TEXT         16.ERASE TEXT,
17.INSTALL SHAPES     18.EXIT

OPTION ?2

NAME ?EXAMPLE
A TO ADD ?A
PRINT NAME = EXAMPLE
?HISTORY
PLURAL =
?
TYPE =
?EXAMPLE
GRAPHIC = 00
?█
```

Parting Thoughts

At present, authoring systems have the advantage of allowing teachers to create tailor-made software. The disadvantage is that the structure of the created software is still within the drill-and-practice area. While this type of program can be useful, it pales before some of the professionally produced educational programs on the market. Still, a teacher can get a lot of mileage from an authoring system. For a look at another inexpensive, flexible system, see the review of *Aristotle Apple* from Stoneware (*Creative Computing* Oct., 1980, p. 56). ☐

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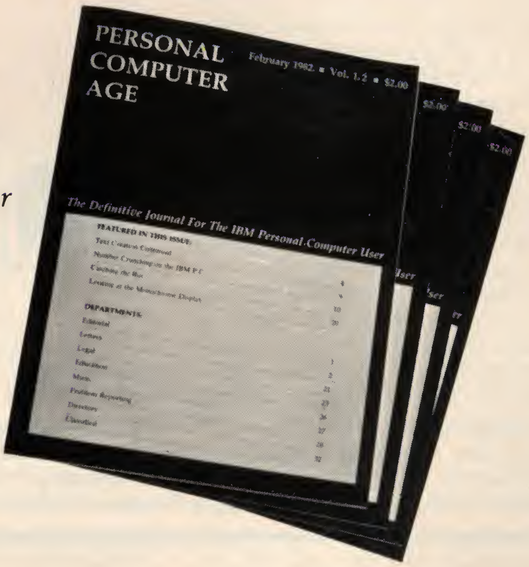

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HEATH

ASSEMBLY LANGUAGE PROGRAMMING

A Continuing Education Course

Greg Greene

I have a friend by the name of Jack Brown. Jack is a software type, that is, he would rather work on problems in software than problems in hardware. "Nothing special about that," you may say, "after all, don't we all have the same affliction? Do we not all pursue the ultimate program? Do we not expound upon the virtues of Basic vs Pascal vs Fortran?"

Each unit has quick 'self-tests' at appropriate places, and an exam at the end.

Well yes we do, but Jack is not content to do things the "easy" way. Jack would rather do it in assembly language. His enthusiasm for bits and bytes knows no bounds and his never-ending zeal to gather converts to his cause brought me to the realization that there must be something to this mysterious way of programming. Therefore I set upon the path of knowledge in search of enlightenment.

It is one thing to seek knowledge, and quite another to gain it. In search of a course of action which would enable me to learn, I looked at several books on assembly language programming for the 8080 microprocessor which my H-8 uses. I found there were quite a few books which explained the instruction set, but few which would enable me to learn how to program. What I needed was something that would give me experience in a controlled fashion so that I could actually do something, rather than just read it from a book. Alas, none of the books could penetrate my thick skull and deposit their knowledge therein.

At this point I noticed that the Heath Company was putting out a home study course in assembly language programming to complement their course in Basic. At the same time I also heard from several friends who had purchased the course that it was not all that good. My friends complained that there were many errors in the printing, and that the course was not organized very well. Also, I was told, the programs presented would not run as they were written on the H-8.

Therefore, I did not buy the course until a local store had it on sale and my continuing search for an alternative had proved fruitless.

The first thing I noticed about "Assembly Language Programming, a Continuing Education Course" was that it was written in an easy, conversational style. Author Willard Nico assumes that the reader knows little of assembly language programming and starts from there. This, for me, was exactly the case. The author also takes the trouble to tell those who have had some experience why he takes this approach. Thus, I believe that even those with experience will not be put off by the way the course is presented. Indeed, they should find it refreshing and a helpful brush-up on some points they may have been overlooking. The introduction clearly states, as all instructional material should, the objectives of the course and the method of achieving them.

Greg Greene, 207-885 Craigflower Rd., Victoria, B.C. Canada V9A 2X4.

There are ten sections, or units, in the course. They start with an explanation of what digital computers are, and what they can do. The course proceeds from the basics of input/output in the beginning units, to the completion of a program that emulates the instructions of the 8080 and shows how each affects the various registers and flags.

This program is called Wise and is worth the price of the course. Each unit has quick "self-tests" at appropriate places, and an exam at the end. Also included is a separate workbook that acts as a test to see if you have absorbed the information, and little drills that require you to write sections of the program by yourself. This technique, together with the introduction of new instructions as they become useful to the program ensure that you progress in a controlled manner. Let's take a look at the units and see what they offer and how they offer it.

First, let me note that there are two appendices, one is a copy of the Heath assembler book, which lists all the mnemonics and the instruction set. The other is a lesson on number sets. You will be directed to these at appropriate spots in the course.

Unit one covers some common definitions which would be new to the novice computerist. These include such things as RAM, ROM, RWM, and a lesson on how to express numbers in binary or hex and convert between them and decimal. This unit also discusses the various registers and flags of the 8080.

Unit two introduces you to programming, explaining what an assembler does, use of the IN, OUT, HLT, JMP, JZ, ANI and MOV instructions. This section shows how, in a typical 8-bit computer, IN and OUT operations are accomplished. These are the basic 'building blocks' of all the programs included in the course.

Unit three introduces such terms as "assembler directives," "source code," "parity," and "stacks." The directives covered are ORG, EQU, END, DB, DS and '*.' New instructions introduced are INX, CPI, JNZ, MVI, DCR, CALL and RET. The section also provides a tour of a typical memory map so you can figure out where to originate your first program. The program you are invited to try is called, "Type My Name Ten Times." You are led through the development of the program, and it is clearly explained why the particular instructions are used.

I think the best way to describe the feeling I had is to ask you to remember how it was when you got your first program—in any language—to run correctly.

At the end of the unit you are invited to try the program on your own computer. I did, and it wouldn't work. The author warns you this might happen, and explains why. I simply followed the directions of the workbook and presto! I had my first assembly language program. I think the best way to describe the feeling I had is to ask you to remember how it was when you got your first program—in any language—to run correctly. I have to admit that making the changes necessary to get it to run on the H-8 taught me a great deal, and that is what I wanted.

Units four, five and six take you through another program, "All Base Conversion," which converts hex to octal, split-octal, decimal and binary. The author uses this program as an example of how to use new instructions and different techniques. Unit six wraps it up with methods for de-bugging and little tricks to make the program run quicker and use less space. Since the conversion program uses different number systems, you learn them also. The author stresses throughout the course, that there are many ways to accomplish the same end and even if yours may take a different route, as long as it gets there it's OK. I found his constant urging to "try it alone" to be just what I needed. My All Base Conversion may not be as short as the author's, but it works!

Units seven to ten, bring you to the Wise program and show you how to use it. Along the way you learn additional instructions and ways to give your programs that professional touch. I must say that despite the clear style and explanations given in the earlier units, I would have understood the various instructions better had I been able to use the Wise program at the start. But you have to walk before you can run, and in a course like this you can always start over if you want. Each time you do, things become a little clearer and you understand a little more.

When you feel that you have it all down pat, you can take the final exam and mail it back to Heath. This is optional, but if you're like me, you'll want that certificate as a mark of your achievement.

A word to the wise: in this course, as in all others, you get out of it only what you put in. So do not skip any of the questions on the self-tests or exams. If you cannot answer them, you have not yet absorbed the material. Go back and try again. If you are really stuck, the answers are all included, but if you have to peek at the answer, make a point of going back and ensuring that you really understand what's going on. Since each unit builds on the information in the previous ones, you will only get further behind if you try to go too fast. I had to go back many times on some of the parts, but I attribute this to the thickness of my skull, rather than to any fault of the course.

Some of the criticisms cited above are valid. There are some mistakes in this book that should not be there. For instance, all of the answer choices for some questions are incorrect, and only the answer sheet has the right one. This is unforgivable in any course, as it creates confusion and resentment on the part of the student.

In some cases, the workbook asks questions that are not covered until the next unit, a very aggravating habit.

All of the programs, when adapted to the particular I/O of your computer, will work. Since you take part in the creation of the programs, you learn, and that's what the course is about. Having completed the course I now understand a lot more about how my computer works. Although I can in no way approximate the "Great Canadian Computer Program," I can see beyond Basic, Pascal and Fortran, and the future is bright indeed. $49.

Heath Co., Benton Harbor, MI 49022. ☐

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CIRCLE 185 ON READER SERVICE CARD

How to Dial a Long Number

David Lubar

creative computing
SOFTWARE PROFILE

Name: Prime Factor Basic
Type: Math Package
System: 48K Apple with Applesoft, Disk Drive
Format: Disk
Language: Machine Language
Summary: Provides 500-digit integer arithmetic
Price: $79.95
Manufacturer:
The Prime Factor, Inc.
14713 Oxnard St.
Van Nuys, CA 91411

The computer should be the ideal tool for working with large numbers. Unfortunately, the floating-point arithmetic found in most small computers has a limited accuracy and range. While this might present no problem in business or in some scientific areas, it presents a problem if one wants to delve into number theory. Nine-digit precision and scientific notation aren't much help when you are searching for a 200-digit prime number.

A solution, for those hunting large primes, sending secret codes, or just exploring large numbers, is *Prime Factor Basic*. This machine-language subroutine hooks into Applesoft, providing 500-digit integer arithmetic. The program supports standard math operations, along with MOD, integer square root, integer square root remainder, greatest common denominator, absolute value, length, and sign. These are all accessed using a colon followed by the @ sign. For instance, :@ X = 33^{19} :@PRINTX will quickly produce the result of raising 33 to the nineteenth power. If the result of an operation produces more than 500 digits, an overflow message is printed.

Prime Factor Basic is a tool awaiting new applications.

The routine also contains a special input statement that accepts only numbers, optionally preceded by a plus or minus sign. Additionally, there is a character counter that displays the number of digits entered. The counter can be turned on or off under program control. For passing variables between Prime Factor Basic and Applesoft, there are STR$ and VAL functions. Finally, for logical structure, there is an IF...THEN structure with a comparison for the condition and any legal statement for the conditional (a GOTO is required if the conditional is a line number).

Since each variable can be very large, the user is limited to 26 simple variables (integer or string) and one array with a maximum dimension of 63. This leaves about 6K for Applesoft programs and variable space, which should be sufficient for many applications. Also, since RUN does not clear Prime Factor variables (a special CLEAR command is used for that), programs can be easily chained by running them as necessary. While this will clear Applesoft variables, it will leave anything belonging to *Prime Factor Basic* intact.

As for applications, the most intriguing and apparent would be cryptography. There are encryption techniques based on large prime numbers, which is an ideal area for 500-digit arithmetic. In the realm of number theory, there are many theorems and conjectures that, while not necessarily provable through simple calculations, might be disproved using large numbers. Essentially, *Prime Factor Basic* is a tool awaiting new applications. The company is planning to publish a newsletter for users, and some existing applications could crop up. ☐

Speeding Up Integer Programs

David Lubar

creative computing

SOFTWARE PROFILE

Name: Integer Basic Compiler

Type: Compiler

System: 32 or 48K Apple with Integer Basic, Disk Drive

Format: Disk

Language: Machine Language

Summary: Fast, efficient and well done

Price: $149

Manufacturer:
Galfo Systems
6252 Camino Verde
San Jose, CA 95119

While many current Apple owners have never worked with Integer Basic, there was a time when that was all we had. You could load Applesoft from tape, but who wanted to bother when there was a fast, easy language available in ROM. Now, Integer is even faster, thanks to a compiler from Galfo Systems. The IBC turns Basic into either pure Galfo Stack Language, or a combination of GSL and 6502 code. Topping it off, the system provides some functions, such as CHR$, that are not available in Integer Basic.

For an initial test of the system, some classic Integer games, such as Garry Shannon's Dragon Maze (listed in the original Apple reference manual) were compiled, with impressive results. In the original version of Dragon Maze, the program draws the maze at a snails pace. In the compiled version, the maze appears in about ten seconds. Other aspects of the program also gained a substantial increase in speed.

While some programs compiled with no problem, others that contained machine language subroutines needed special attention. Fortunately, the code produced by IBC can be located anywhere in memory. Thus, if a program contains routines from $800 to $1FFF, using LOMEM:8192 will prevent any memory conflicts.

The actual compilation is very rapid. If the user declines the print option that displays the compiled code, his wait is just a few seconds. With printout to the screen, the process slows considerably (not through any fault of IBC, but because of the time required to print to the screen). Whenever a program is compiled, the user has the option of either maximizing speed or minimizing program size. The end application, and the size of the initial program, will determine the choice. Pure Galfo Stack Language takes the least space. The mix of 6502 and GSL requires more room but produces the fastest code. In general, speed increases can range from 5 to over 50 times faster than Integer Basic.

Once the program is compiled, it requires a run-time routine. This code is just over 3K in length and can be loaded on any page boundary. If the compiled code and run-time package are saved as one file, that file can then be BRUN right from disk (Galfo Systems requires users to apply for a license if the compiled code is to be used in any commercial application.)

While the IBC can be used to compile existing programs, it can also be put to good use when writing new code. The system supports several commands that greatly enhance the power of Integer Basic. CHR$ and GET are provided, along with a KEY function that determines whether a key has been pressed, and if so returns the ASCII value of the key. Since Integer Basic checks the syntax of each line as it is entered, one might suspect that the computer would consider CHR$ or any other irregular keyword to be an error. However, there is no problem since Integer Basic allows any length variable. A statement such as D$ = CHR$(4) will be accepted by the Integer Basic, which is fooled into believing that CHR$ is a variable name. The compiler recognizes these extended functions and produces the proper code for them.

Another set of extended functions is available by prefixing the command with DSP. Normally, DSP tells Integer Basic to display the value of a variable whenever that value changes. Again, by following DSP with a special command, the system is tricked into treating it like a variable, while the compiler is capable of producing the desired code. Commands that work with DSP include HOME, CLEAR, INVERT, NORMAL, and FLASH. There are also commands to change graphics modes, plot points, and draw lines or shapes. The line and shape routines require the original Hi-res subroutines that were once provided with Integer Apples. These routines are limited to one shape entry rather than a table, but it is possible to use different shapes by changing the pointers to the shape.

If you have a large library of Integer Basic programs, or write programs in Integer Basic, the Integer Basic Compiler is definitely worth considering. It is fast, both in compilation and execution, performs as promised, and is very easy to use. While it won't produce a hi-res game that operates at the same speed as one written in straight 6502 code, it will greatly increase the speed of Integer programs, and could be very valuable in many areas of programming. ☐

Well-Fashioned Forms

David Lubar

creative computing
SOFTWARE PROFILE

Name: Personal Filing System
Type: Data Base
System: 48K Apple, DOS 3.3, Disk Drive, Apple III
Format: Disk
Language: Run-time Pascal (?)
Summary: Excellent and easy to use.
Price: Apple II, $125.; Apple III, $175.
Manufacturer:
Software Publishing Corp.
1901 Landing Dr.
Mountain View, CA 94043

A great many software companies seem to be offering some form of data-base program. These programs vary from highly-specialized software for specific types of data to general-purpose programs capable of handling a wide variety of information. Some are simple to use while others practically require a degree in computer science or the equivalent. *PFS*, a generalized data base, is user friendly and quite elegant.

This program was definitely designed with the user in mind. Its strongest feature is the way it treats information. Your data are stored in forms which you design. There are no requests for field specifications, record numbers, variable types or other parameters. To get started, all you have to do is design a form, any form at all. Each form resembles a sheet of paper, and is created right on the screen. If one page isn't enough, you can add more. The form is designed simply by typing in the headings anywhere on the screen. The only restriction is that you should leave enough space between headings to accommodate the data that will be entered. Since forms can be more than one page, this is no great restriction.

Once a form is designed, it is saved on a disk. Then, whenever you want to enter data, you just fill in the form. There are no restrictions against characters in the data; commas and quotation marks can be entered without causing any trouble. This is another sign that *PFS* was designed with the user in mind. Once any individual item has been entered, the right arrow key tabs to the next heading. This is simple and elegant. Of course, there is more to a data base than just entering information. You also have to be able to search, change, and delete items.

The search mode of *PFS* is very well designed. You can search for a complete match on any item or a combination of items from different headings, or search for partial matches. Suppose you have a mailing list stored on *PFS*, and want to find all addresses on PINE ST. (Entries are in upper case.) All you have to do is bring the form onto the screen, move the cursor to the address heading, and enter ..PINE.. as your search parameter. This would turn up any entry containing PINE as part of the address. Let's say you have a list of names where the first name comes last. To find all the SMITHs, you could search the name field for SMITH... To find all the JOHNs, the command ...JOHN would be used. Items can be entered in more than one heading, allowing, for example, a search for all SMITHs who live on PINE ST and are 65 years old. Numerical sequences can be found even if the search parameters leave out intervening characters such as commas. You can also search for numbers that are greater or less than a specific number.

Once a form has been found with a search, you can make changes, or delete an entry from the disk. The form concept allows great flexibility when making printouts. You can have the forms printed with or without headings, you can request printouts of only part of the form, you can specify a line feed or just a space between items, and you can print items found in a search or print all items. As an example, suppose you have a form containing complete ordering information for business customers. By requesting a printout of just name and address, you've turned *PFS* into a mailing-list generator.

A backup utility is provided which allows users with two drives to copy data disks. *PFS* also initializes new data disks from within the program, avoiding the need to prepare disks beforehand.

One aspect of the program might prove slightly inconvenient for experienced Apple owners. Instead of using RETURN, the program uses CONTROL-C to signal that you are done with a form. It takes a bit of getting used to. Luckily, hitting RETURN by accident does no damage. It's very hard to lose data in this program. In general, the whole system is very forgiving of mistakes. The only potential for losing data occurs if you exit the system without saving the most recent entry. In this case, you would lose only the form that was just filled.

The documentation includes an example showing how to generate a mailing label. More needs to be said about the booklet. Except for the lack of green ink, it greatly resembles Apple documentation, both in layout and quality. The pages of this spiral-bound manual are filled with screen photos and other helpful information. The user is gently stepped through all aspects of *PFS*.

While all this sounds almost too good to be true, there are some functions that are lacking in *PFS*. It has no sorting capability, and it does not allow any manipulation of numerical entries. For instance, you can't obtain the sum of all entries for a specific heading. But these limitations are minor or inconsequential in most cases, and are more than compensated for by the speed and utility of the program. For general use, whether at home or in the office, *PFS* is an outstanding program.

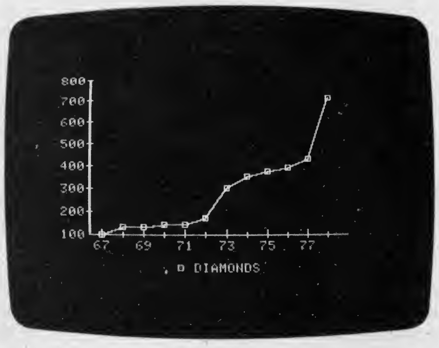
Creative Computing will be covering more data bases in future issues. If the above software doesn't meet your needs, keep watching. ☐

Evaluation of VisiTrend and VisiPlot from Personal Software

David H. Ahl

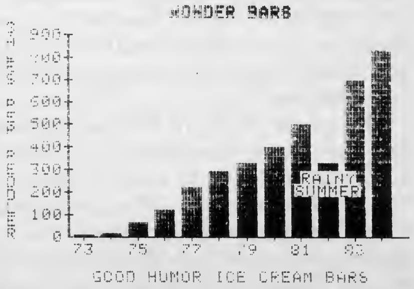
July 3, 1981. My financial officer handed me the results for the month of June. Not a remarkable event in itself, except that June 30 marks the end of our fiscal year.

Sitting at my desk, I got out my pocket calculator and started to manipulate the figures to develop fourth quarter, second half, and fiscal year results. I immediately realized that the job was about twice as big as it had been a year before and even considerably larger than six months earlier. The reasons: we acquired a new magazine (*Microsystems*) at the beginning of the year, started a new magazine (*SYNC*) in January, and established a new division (Education Center) in February. All this meant that I was faced with the financial figures from seven separate operating entities rather than the four that we had at the end of the previous fiscal year.



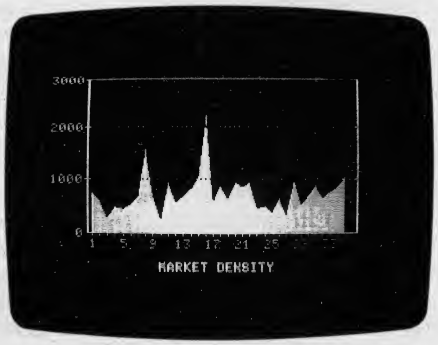
Sample line chart.

Hence I decided that it was time to learn VisiCalc, VisiPlot, and VisiTrend. Although I had a minimal working knowledge of VisiCalc, the combination VisiTrend and VisiPlot package had just recently arrived and I hadn't even taken off its plastic wrapper.

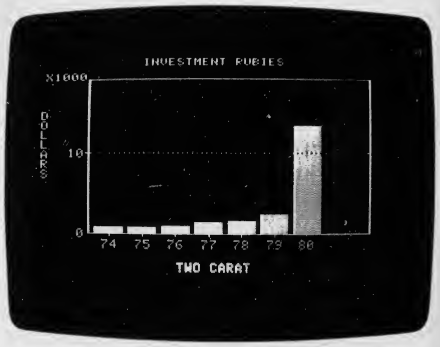


Bar chart printed by Apple Silentype printer.

My first chore was to get the monthly data for the entire fiscal year into VisiCalc. This I did with little difficulty. However, as I approached the end of the first quarter the speed with which the program was accepting the data slowed noticeably. Each column of the table consisted of 28 individual entries such as total sales, subscription revenue, retail sales, Peripherals Plus individual sales, and the like. In addition, each column had eight calculated subtotals and eight calculated percentages. Thus, at the end of a quarter the program was dealing with approximately 40 x 3 = 120 separate pieces of data.



Sample area chart.



Sample bar chart.

By the end of six or seven months of data, entry had become annoyingly slow, and by the end of twelve months, it had really bogged down. Nevertheless, I was consoling myself with the thought that, once in, it was there forever for whatever analyses I may wish to do. All told, it took about two hours to enter the approximately 275 data points for a full fiscal year. I had also, in that time, entered all of the column and row titles and the various formulas for calculations of subtotals and percentages, and had printed out the resultant table.

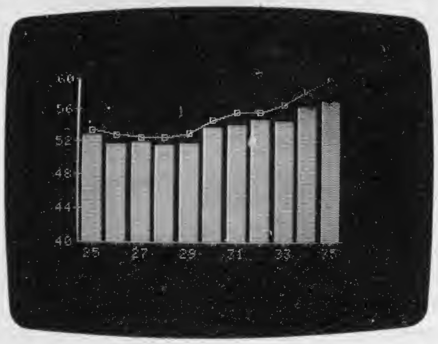
A brief aside. Printing is probably one of the least capable attributes of VisiCalc. There is no "intelligence" whatsoever built into the print routines. For example, the printer will space across by individual spaces to "print out" a blank line. Furthermore, the routines do not take advantage of printers that do have some "intelligence" built in. I use a Diablo 1640 printer with bi-directional printing and a fairly large print buffer built in. While not as fast as a line printer, for normal correspondence the printer is more than adequate. On the other hand, VisiCalc does not take advantage of the buffer or bi-directional printing capabilities and, appears to wait for a signal from the printer that it has printed a character before sending the next one. Thus, a 60-line page that is normally printed out in about two minutes, takes over ten minutes with VisiCalc.

I don't mean to sound negative. The program is still faster, more capable, and more accurate than any alternative, particularly pocket calculator and pencil. Nevertheless, there are certain frustrations in using it.

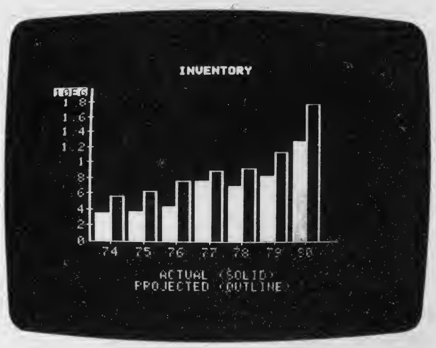
VisiPlot

Currently available for only the Apple computer, VisiPlot is one-half of a new package from Personal Software that also includes VisiTrend. The VisiPlot portion of the package, as its name suggests, allows one to display data in graphical form on the screen and print it out on a wide variety of supported line printers. The program can make six types of charts: line, bar, area, pie, hi-lo, and scatter. In addition, it allows combining the same or different types of charts. For example, a line chart may contain one, two or three lines. A comparative bar chart may display two different bars on the same X axis or two bar charts may be displayed one above the other. A line chart may be combined with a hi-lo chart. While the possibilities are not endless, they should be sufficient to meet most normal business needs.

Like VisiCalc, the VisiTrend and VisiPlot package is entirely menu-driven. Actually, VisiTrend and VisiPlot make much more extensive use of menu commands than does VisiCalc. Menu items are selected with the right and left arrow keys and space bar. Although the commands do what one would "naturally" expect, to provide even more help, when a one-word menu item is selected, it is highlighted in reverse video, and a more complete explanation of the item appears immediately above it. Even if one presses the wrong key, or selects an inappropriate item, there are built-in escapes and exits on every level at nearly every point. Usually, when using a program for the first time, I get into some kind of trouble that necessitates reloading the entire disk. In my first eight hours with VisiTrend and VisiPlot, this did not happen once. I am not saying that all went perfectly; however, when faced with a difficult situation, I was always able to bail out without losing any data and without having to reload the program.



Combination line and bar chart.



Bars may be displayed side by side for comparative purposes.

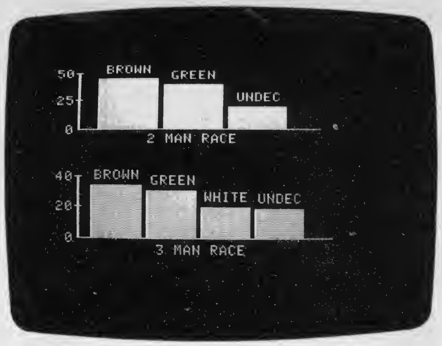
As the manual says, "Any time you seem to be at a dead end with no way to continue, press any key except reset, shift, or control." From my personal experience, I can verify that this advice really works.

A Tutorial Manual

The manual is divided into three sections. The first section (24 pages) is an introduction to VisiTrend and VisiPlot including definitions, program and disk loading instruction, and some general background about using the menu. The majority of the manual, 105 pages in all, is devoted to a tutorial in how to use VisiPlot, VisiTrend, and the data entry and edit program. This tutorial section is divided into five lessons, each of which takes about one hour to go through fairly thoroughly.

After completing two lessons in their entirety, I skipped around a bit to get to the sections describing what I really wanted to do with the data that I had. As a result, I probably missed learning about some of the features and nuances of the system. On the other hand, in a six-hour period, I was able to produce sixteen charts and run several trend projections, which was far more productive than the same six hours would have been with calculator, pencil, and graph paper.

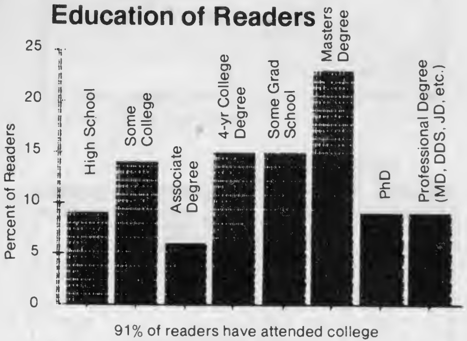
The third section of the manual, 38 pages, is a reference guide to the use of VisiTrend and VisiPlot. I saw nothing in it that was not previously covered in the tutorial section. However, it may be more efficient once one is proficient with the system, to look up desired capabilities in the reference section, rather than leafing around in the tutorial section.



Two groups of bars may be displayed simultaneously.

Personal Software also thoughtfully includes a pocket reference card which has no less than fourteen 3 x 6" panels of information. One wonders whether pocket reference cards aren't getting a bit out of hand; but I found this one quite useful.

As the saying goes, "A picture is worth a thousand words," hence I have included a substantial number of charts with this article. Some of them are taken directly from the screen while others are printed on an Apple Silentype printer. There is little difference between the two as the print out program merely replicates the high resolution screen on the Silentype printer. Other printers that are supported by the VisiTrend/VisiPlot program include the IDS Paper Tiger 440 and 445 (with graphics option installed), the NEC Spinwriter 5510, 5515, 5520, and 5525 (with graphic option installed) and the Trendcom 200.



91% of readers have attended college
77% have a college degree
41% have a Masters, PhD or higher

Charts may be "improved" by adding normal type.

Data Entry Surprises

The VisiTrend/VisiPlot package contains an extensive data entry and editing facility. This facility allows the user to create a new data series, and modify existing data series. The editor allows one to jump to specific places within a list, insert new data points between existing data points, delete points, format the manner in which data are displayed, print the contents of a series and the like. Like

Find the glittering Orb, and get out alive—that is your quest. But the Orb lies somewhere in the unknown depths of a multi-level dungeon, and a horde of monsters bar your way. Each trip you make into the dungeon, if you survive, gains you experience and magic—making you stronger, allowing you to go deeper, bringing you closer to the fabulous Orb.

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Only $24.95. Ordering information below.

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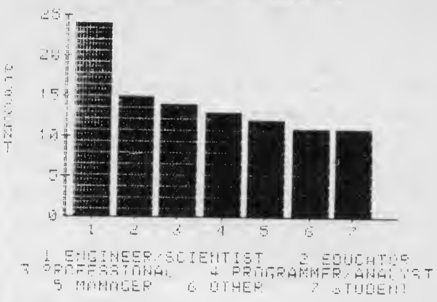
VisiTrend, continued...

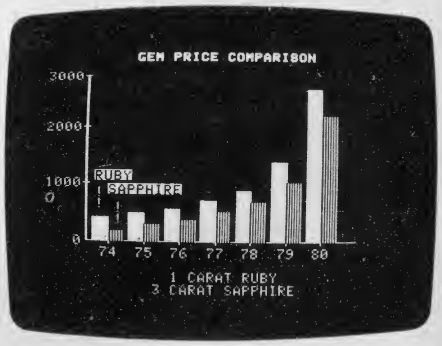


Bar chart printed by Apple Silentype printer.

the menu-driven plotting portion of the program, the data entry and editing portion of the program were simple to use.

However, I did not expect to have to use them with live data as I had all of the data that I wanted entered on a VisiCalc disk. VisiTrend/VisiPlot has the ability to accept data from VisiCalc which has been stored in the "standard" data interchange format (DIF). However, as a sentence buried in the middle of page 2-49 points out, "This means that interchange between the two products is only possible if you have a copy of the VisiCalc program at a version number higher than the 1.37." While I do, it just so happens it was not the one that I used in entering all the fiscal year data.

Even so, it appears that it would have taken at least as much time to edit the VisiCalc data for plotting as it did to enter new data. For example, my columns consist of three individual months followed by a quarterly summary. For plotting purposes, each of the quarterly data points would have to be edited out. Likewise, my rows include individual sales results followed by subtotals and percents for each of our seven divisions. Again the subtotals and percents would have to be deleted. I judge that re-entering the data points that I wished to plot took no more time than editing the original VisiCalc file. This, of course, would not always be true and the data interchange feature is not one to be downgraded.



Labels may be inserted anyplace on the chart.

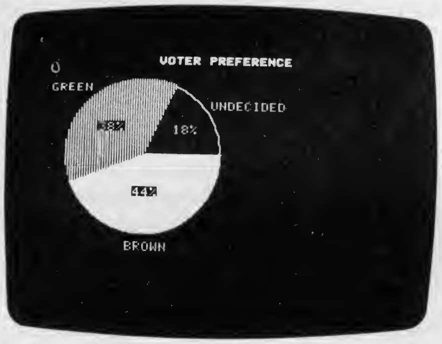
As mentioned earlier, nearly every combination of charts is possible. Unfortunately, I tried to produce several that, try as I might, I could not. For example, using the VisiTrend program (more about that later) I ran a projection of sales for the next twelve months. I attempted to plot current sales for periods one to twelve and future sales for periods thirteen to twenty-four. Unfortunately, without extensive editing, this is not possible. It was easy enough to plot both sets of data on a line chart however it was not easy to plot data set one from period one to twelve and data set two from thirteen to twenty-four. Also, since most of my other charts were bar charts, I wished to present these data (twenty-four months worth) in a bar chart format. Unfortunately, I could not do it. Some experimentation indicated that the upper boundary on the number of bars that could be displayed is sixteen, however, I could not find this any place in the manual.

Other New Visi-Packages

VisiDex, named for the popular Rolodex information retrieval system, allows storage and retrieval of screens full of information in a free-form, unstructured manner. It can also maintain a calendar of appointments and reminders. One can think of the screen as a 5 x 7" filing card with up to twenty lines. Up to thirty-six keywords can be specified for each screen and the entire screen can be recalled by any keyword. Additional facilities include the ability to set up "templates" for applications such as mailing lists, on-screen editing, sorting keywords in alphabetical or numeric order or for print out purposes, and selective printing of partial screens. The price of VisiDex is $199.95.

VisiTerm is a communications software package designed for use with several popular modems such as the DC Hayes Micro Modem and others. The package provides full upper and lower case ASCII communications, with proportional spacing and smooth scrolling at speeds up to 1200 bps. The package is principally designed for the transmission of VisiCalc data, text, VisiPlot graphics, and related programs. The program comes with pre-defined regular, boldface, and APL characters, although it also allows the user to design his own character set. Like the other packages in the series, VisiTerm is menu driven with single stroke characters. Retail price is $149.95.

As mentioned in the VisiPlot review, VisiCalc has been updated to support a Data Interchange Format (DIF), a program independent data storage technique. The updated VisiCalc also supports Boolean functions and arithmetic comparisons as well as having 17 new simplified commands. It, like the other new Visi-series packages, is supplied on the Apple 16-sector diskette format. Price of the revised VisiCalc is $199.95. □



Sample pie chart.

Another minor difficulty I ran into was in the printing out of pie charts. Again, not in the manual, is the fact that a pie chart can only have eight slices and, unfortunately, I was trying to produce a ten-slice pie. Much consternation and gnashing of teeth until I figured out what was amiss and combined several of the pieces. Another small problem with pie charts: the eight different colors looked delightful on the screen, however, on the printer several of them are represented by the same method of shading. Hence, I found it was most satisfactory to use just three colors: white, black and green which, on the printer, are all distinctly different.

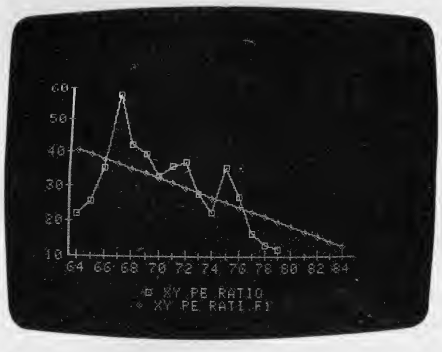
VisiTrend

The VisiTrend program develops ancillary data series used in analyses and forecasting techniques. The methods include derivation of moving averages, smoothing data, percent of change, leading, lagging and cumulative total functions. Additionally, new series can be created by taking ratios logs, or other mathematical or logical transformations of the data.

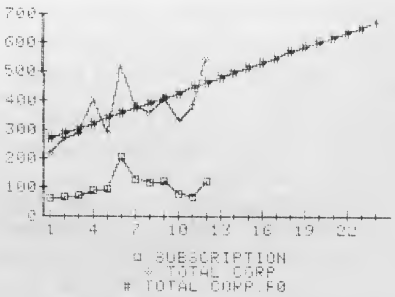
The program performs linear multiple regressions (using the ordinary least squares method). It also calculates and displays the major statistical measures of a multiple regression including the standard errors of the coefficients and the regression, t-statistic, R-bar squared, the F-statistic and the Durbin-Watson statistic. It also performs trend line forecasting.

Needless to say, this is an extremely comprehensive statistical package and most users will not need a fraction of what the program can deliver. Nevertheless, there are probably one or more statistical measures useful to each different user, so the program offers a complete smorgasbord.

For my purposes, I was interested in trend forecasting using linear regression and a moving average function with exponential smoothing. I had no trouble using either of these capabilities and, in about one-half hour, was able to develop several trend forecasts and moving averages. I then stored the results of these forecasts, moved back to the VisiPlot portion of the package, and plotted the results.



Line chart with a projection made by VisiTrend.



Two lines on chart with VisiTrend least squares projection.

While it is helpful to have detailed statistics, one can get overwhelmed. At one point, when I was running trend lines on virtually everything in sight, I took a break and got to thinking, "What am I going to do with all of these data?" The computer, of course, will generate anything you want. However, it is only a tool and human judgment must be used, probably more than ever before, to determine what the computer ought to be doing.

In Summary

I found the VisiTrend/VisiPlot package exceptionally user-friendly and easy to learn. The manual, particularly the tutorial section, is outstanding. While user mistakes are inevitable, the software is quite forgiving and rarely, if ever, loses any data. The package helps analyze data accurately, produces attractive charts and graphs, saves time, and is an outstanding business tool. I recommend it highly.

VisiTrend/VisiCalc is produced by VisiCorp, 1330 Bordeaux Dr., Sunnyvale CA, 94086 and is available for $259.95 at computer stores throughout the country. □

VisiTerm from VisiCorp

Terminal Communications for the Apple

Ken R. Hancock

VisiTerm is a terminal communications program that was written by Tom Keith of VisiCorp. It is a member of a popular series of Apple programs which includes VisiCalc, as well as VisiDex, VisiTrend/VisiPlot, Desk Top Plan and CCA Data Base Management.

All of these programs can save their data in a standardized form which Personal Software calls the Data Interchange Format. Thus, data developed using one program can be shared by the others. This feature greatly increases the usefulness of the series.

Documentation

The documentation consists of three separate pieces; the manual, the VisiTerm Pocket Reference card and the Personal Software User Assurance Plan card.

The manual is a professionally prepared document which comes in a three-ring binder. It is written by Jeffrey Emmet Levinger.

The manual, which is 100 pages long and features numerous photographs and drawings, is divided into the following parts: Table of contents, Preface, Introduction, VisiTerm Tutorial (three separate lessons), Reference, Appendices (eight in total), Glossary, and Index.

Most of the manual is written for the first time user and as a result may seem too wordy for the seasoned communications veteran. However, this is preferable to a manual that is lacking in critical explanation.

The VisiTerm Pocket Reference card is, when folded out, about four square feet of tables, photographs and abbreviated definitions of the numerous VisiTerm commands. It is divided into the four separate modes of VisiTerm operation: terminal mode, macro definition mode, options mode and file transfer mode. If you are considering the purchase of this program I would recommend that you take a look at the card first, it certainly is the best capsule of VisiTerm information.

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SOFTWARE PROFILE

Name: VisiTerm

Type: Communications

System: Apple II or II+, 8K Memory, 1 Disk Drive

Format: Disk

Language: Applesoft

Summary: Superb

Price: $100

Manufacturer:

VisiCorp
2895 Zanker Rd.
San Jose, CA 95134

The VisiCorp User Assurance Plan is a card containing the warranty registration, backup diskette order card and a replacement disk order card. VisiTerm is a copy-protected disk and only one copy of the program is supplied with the package. The backup disk costs $30.

Although VisiTerm is copy-protected, the method of protection is not as restrictive as some of the techniques used in the industry. A VisiTerm diskette will CATALOG normally and display each file like a standard 3.3 disk. It will also allow changes to the programs on the disk without causing abnormal behavior.

Screen Display

Figure 1 shows an actual screen dump of a VisiTerm display. I created all the text on this screen with the exception of the bottom line. This line is reserved by VisiTerm as a status line.

The "COL- 1" is a column counter indicating that the next character will be typed into column one. The "HALF DUPL" indicator tells us whether we are in half or full duplex communications.

The "SET A" informs us that character set A is in use. This line also indicates when an escape key has been pressed and when the CAPS LOCK is activated.

The screen display of VisiTerm dynamically proportions characters as they are written to the screen, courtesy of high-resolution graphics. In this way, a larger number of characters can be displayed on a single line. The actual number depends upon the number of upper and lower case characters, but, given typical lines of text, 75 columns or more can usually be displayed. All of this is accomplished using only the VisiTerm software. No 80-column card or lower case adapter is required.

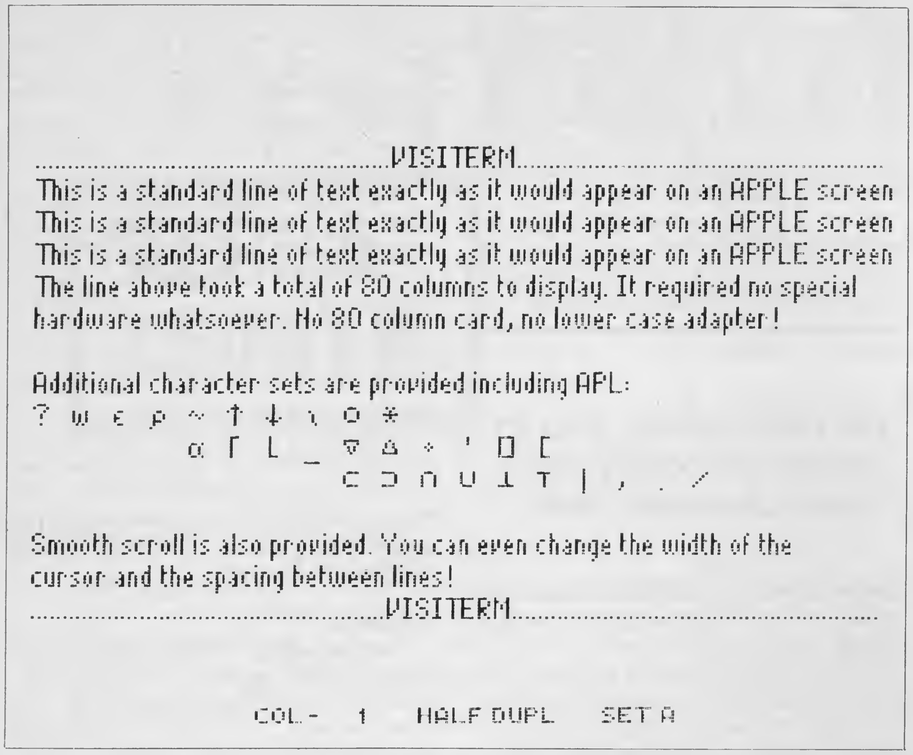
This display technique has several advantages as well as disadvantages. First, it permits several different character sets to be supported. Second, it allows smooth scrolling, which is much better than the line by line scroll of a typical Apple screen. Third, this technique also permits the spacing between lines to be altered by the user. Invoking or changing any of these features can be done while on-line.

While, on one hand, it is best to have the maximum number of characters on one line; on the other, there are times when rigidly fixed columns are desired, such as when you are displaying a column of numbers. With VisiTerm, if you want to display such a column of numbers a different character set must be loaded.

This character set is not much different from the standard Apple set and, therefore, does not allow a great number

---

Ken R. Hancock, 1544 Lakewood Road West, Edmonton, Alberta, Canada, T6K 3J4.



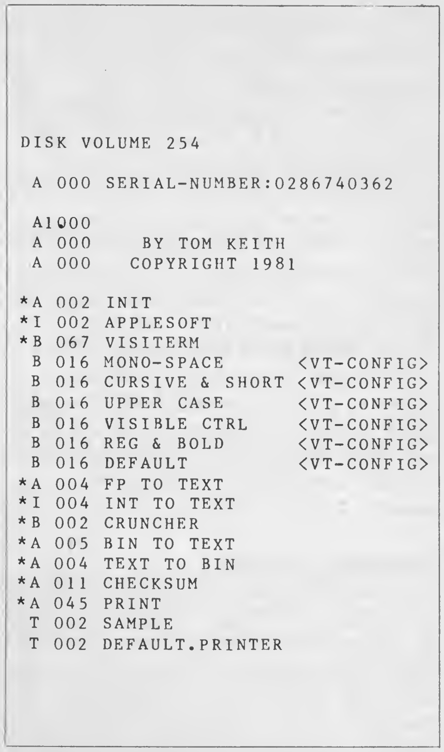
```
..............................................VISITERM..............................................
This is a standard line of text exactly as it would appear on an APPLE screen
This is a standard line of text exactly as it would appear on an APPLE screen
This is a standard line of text exactly as it would appear on an APPLE screen
The line above took a total of 80 columns to display. It required no special
hardware whatsoever. No 80 column card, no lower case adapter!

Additional character sets are provided including APL:
?  ⍵  ∊  ⍴  ~  ↑  ↓  ⍳  ○  ⍟
               α  ⌈  ⌊  _  ∇  ∆  ÷  '  ⎕  [
                         ⊂  ⊃  ∩  ∪  ⊥  ⊤  |  ,  .  /

Smooth scroll is also provided. You can even change the width of the
cursor and the spacing between lines!
..............................................VISITERM..............................................


                    COL-   1    HALF DUPL    SET A
```

Figure 1.



```
DISK VOLUME 254

 A 000 SERIAL-NUMBER:0286740362

 A1000
 A 000    BY TOM KEITH
 A 000   COPYRIGHT 1981

*A 002 INIT
*I 002 APPLESOFT
*B 067 VISITERM
 B 016 MONO-SPACE         <VT-CONFIG>
 B 016 CURSIVE & SHORT    <VT-CONFIG>
 B 016 UPPER CASE         <VT-CONFIG>
 B 016 VISIBLE CTRL       <VT-CONFIG>
 B 016 REG & BOLD         <VT-CONFIG>
 B 016 DEFAULT            <VT-CONFIG>
*A 004 FP TO TEXT
*I 004 INT TO TEXT
*B 002 CRUNCHER
*A 005 BIN TO TEXT
*A 004 TEXT TO BIN
*A 011 CHECKSUM
*A 045 PRINT
 T 002 SAMPLE
 T 002 DEFAULT.PRINTER
```

Figure 2. Typical VisiTerm 'catalog.'

of characters on a line (70,MONO-SPACE). But, it is still true, that for most text transmissions VisiTerm is as good as an 80-column card.

File Handling

VisiTerm itself will work with only two types of files: a 16-sector binary configuration file or a text file format used to store data transmissions.

Figure 2 shows a CATALOG of a VisiTerm disk. All the files shown are supplied with every VisiTerm package.

Six of the first file type, the 16-sector binary file, are supplied with VisiTerm. These are the files that are followed by "<VT-CONFIG>." They not only save the character sets but all the current VisiTerm settings as well. They could be likened to a snapshot of the VisiTerm operating mode.

Of the second file type, only one short example is supplied. This is the text file called SAMPLE. It is a short Applesoft Basic program that has been converted to a text file.

Thus, VisiTerm will transmit only text files. But, it supplies four conversion programs that allow you to send and receive the four file types—Applesoft, Integer, binary and text. To transmit an Applesoft Basic program, for example, you would run the Applesoft program called FP to TEXT, which would then prompt you for the program you wish to convert.

You may have noticed that two conversion steps seem to be missing. It appears that Personal Software neglected to supply a TEXT TO FP or TEXT TO INT program. In fact, neither of these programs is necessary. This is because any standard Apple will automatically convert from text to Basic by means of the EXEC command.

That is, if you have just received a text file that you wish to convert to Basic, simply type "EXEC filename" and the text file will be converted to a Basic program residing in memory. Remember to type NEW prior to executing this command or you will end up with an unfortunate merge of two programs.

The BIN TO TEXT program works in an unexpected way; it converts all binary characters to their equivalent hexadecimal representation. Thus, a control-m character, equivalent to a carriage return, would be transmitted as an ASCII "O" followed by an ASCII "D." A conversion like this is necessary because of the difficulties involved in transmitting an unaltered binary file.

For example, suppose we had a short binary program in memory that we wished to transmit. Also suppose that this short program contained an absolute ORA instruction. Well, as it happens, the hex code for an absolute ORA is OD, which is a carriage return, as previously mentioned. As you can see, there would be no way to discriminate between carriage return and an absolute ORA instruction.

This conversion method has the unfortunate drawback of creating a text file that is about twice the length of its binary counterpart. This characteristic degrades the capacity of VisiTerm in certain cases. Since the maximum number of characters that VisiTerm can receive in one block is 18,384, the maximum length of a binary reception is only about 9000 characters. Also, this conversion method does not allow binary files that are being used as text files to be properly transmitted. The conversion will not work with an Applewriter file for instance.

File Transfer mode allows data to be transmitted or received in a block. This is the mode that would be used to transmit a text file.

All conventional transmission protocols are supported including EOB-ACK (End Of Block-Acknowledge) as well as STP-STR (Stop-Start). Auto acknowledge is also allowed as are combinations of the above. Further, VisiTerm gives you the ability to change the EOB or the ACK characters to any ASCII value. Similarly, both the STP and STR characters can be changed to accommodate nearly any convention.

Let me give you an example of a block data transmission to illustrate how these characters would be used. Suppose we wished to transmit a Basic program, line-by-line, into a timesharing editor such as the MTS (Michigan Timesharing System) editor. This editor prompts line-by-line with a question mark and accepts data in conventional ASCII.

First, we would convert our Basic program to a text file using the FP TO TEXT program. Then we would go to the VisiTerm Options mode (Escape shift 1 from the Terminal mode) and change our EOB character to a OD (since the ends of our Basic lines are marked with carriage returns). We would then change the ACK character to a 3F which is the ASCII value for a question mark.

Next, we would go to the File Transfer mode by pressing F. We would then type in the name of the file we wish to transmit by typing "Escape filename." VisiTerm must now be told what communications protocol we wish, so we would select EOB-ACK by pressing either of the arrow keys. Provided the MTS editor is invoked, the file will be successfully transmitted by merely typing an "S" for "Send."

This is one way that data could be transmitted to the MTS system. A better way, which works very well using different EOB and ACK characters, is the MTS COPY *SINK* or COPY *SOURCE* commands.

Convenience Features

One of VisiTerm's most useful modes of operation is the Macro Definition mode. In this mode, a character on your keyboard can be made to represent a whole string of characters or commands including embedded carriage returns. If you are using a timesharing system such as The Source, this will greatly simplify your sign-on procedure.

All macro definitions are saved with all the other VisiTerm options in a <VT-CONFIG> file.

VisiTerm allows you to use your DC Hayes modem with your Apple at either 110 or 300 Baud. Unfortunately though, you cannot save a dial up number in a <VT-CONFIG> file and you must dial each time by typing the appropriate number on the Apple keyboard.

Whether you are using a DC Hayes, an Apple communications card or a 1200 baud CCS 7710 card, VisiTerm automatically locates the card and sets itself accordingly. However, you can change the slot number it suggests if you desire.

VisiTerm allows you to create or modify your own character sets.

VisiTerm allows you to set the Data Format to almost any combination of 7 or 8 bits per character, odd, even, or no parity, as well as 1 or 2 stop bits. Further, you can change the length of a break character from 0.00 seconds to 2.50 seconds in hundredths of a second increments.

VisiTerm also gives you control over such elegant things as setting the volume of the ticks which are heard when you press a key. You can also change the column number at which VisiTerm is instructed to beep automatically—72 being the standard value. Also, you can change the length of the Tab set.

You may remember from Figure 2, the VisiTerm CATALOG, that a fairly lengthy Applesoft program called PRINT was present. This is another Basic program which allows you to print a text file that is resident on your disk. VisiTerm does not allow for simultaneous printing and terminal communications. This feature would be a welcome addition.

Certainly well beyond a convenience feature, VisiTerm also allows you to create or modify your own character sets. This feature gives VisiTerm a nearly worldwide appeal—an intelligent choice for a communications program.

Conclusion

I am impressed. Personal Software received, and still receives, a shower of compliments and commendations for its VisiCalc program. VisiTerm follows in the same tradition of superb documentation and effective, stable software.

It will be no surprise to see a flurry of VisiTerm related products following in its wake. VisiTerm, like VisiCalc, will be with us for many years. ☐

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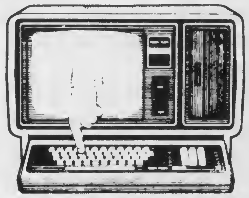

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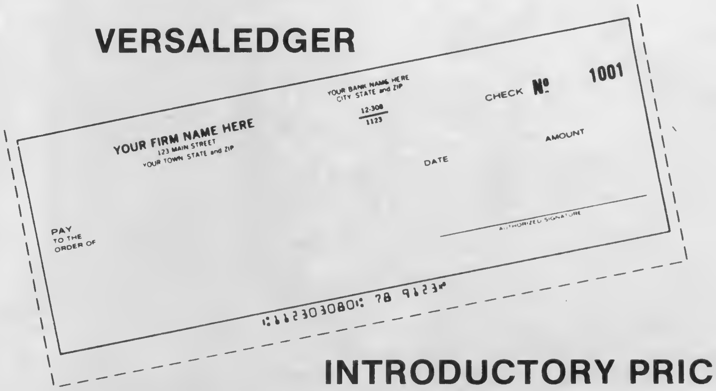

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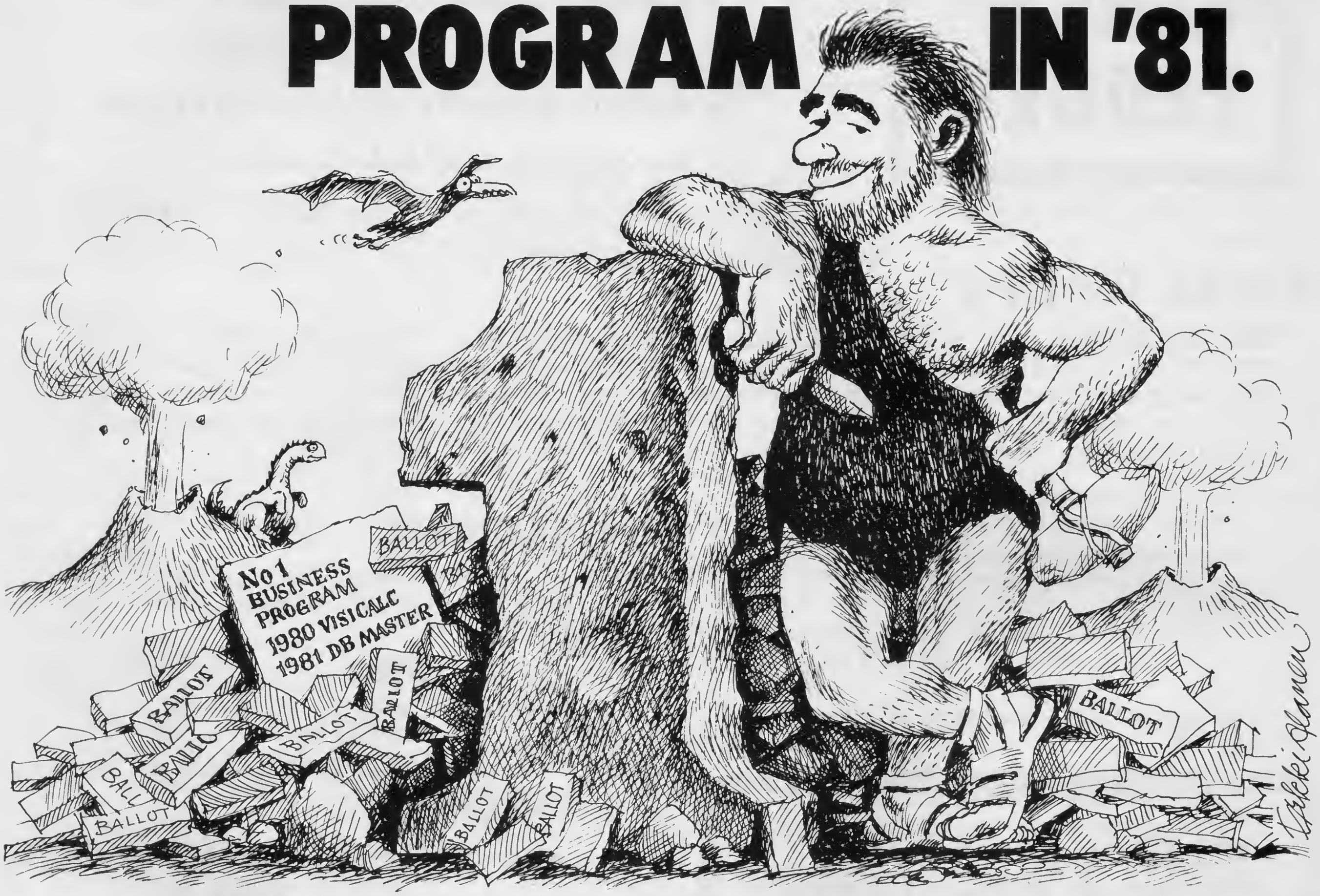

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CIRCLE 192 ON READER SERVICE CARD

The TRS-80 as Smart Terminal

Herb Friedman

creative computing
SOFTWARE PROFILE

Name: Omniterm
Type: Communications
System: 32K TRS-80, Disk Drive
Format: Disk
Language: Machine
Summary: Turns the TRS-80 into a smart terminal.
Price: $95
Manufacturer:
Lindbergh Systems
41 Fairhill Road
Holden, MA 01520

Omniterm is a program that converts Model I and III TRS-80 computers into "smart" terminals; or to be more precise, into "super smart" terminals. Requiring only 32K of RAM and one disk drive, *Omniterm* gives the personal computer user many of the advantages and features available on giant mainframe computers.

Just as a start, consider this. You have a TRS-80 and your friend has a Zenith/Heathkit H89. Your chances of swapping programs other than by typing in a listing are nil. Yet with *Omniterm* and a modem at each computer, you can swap programs over the telephone line, actually feeding the electrical signals of one computer into the other.

What's that? You say there are differences in Basic that prevent a direct swap? Not so. *Omniterm* has an in/out editor, and a translator that straightens out standard ASCII, which really isn't all that standard. In fact, only one location needs *Omniterm* because *Omniterm* can make the translations both ways. You can use the editor on incoming and outgoing signals to ensure that they match the computer(s).

A smart terminal allows you to use your computer as a computer even when it is working as a terminal.

For those of you completely lost in all these new terms and phrases, let's go back to the beginning and explain "smart" and "dumb" terminals.

The common form of terminal with which most computer users are familiar is the TTY (teletypewriter) arrangement consisting of a keyboard—called the "transmitter" or "sender,"—and a display—the receiver—that provides either a hard copy printout or a CRT display. The keyboard and display are two separate entities. They are rarely connected in normal use although some form of interconnect is provided to check out the complete terminal.

Typing on the keyboard produces a local display. Normally, the terminal connects to a local computer or to a remote computer via a modem and telephone line. The remote can be a time-share or a personal computer.

The information typed on the keyboard is fed to the computer. What is seen on the display is actually an echo provided by the computer, which is fed back to the display so the user can check the information he has entered on the keyboard.

Smart and Dumb Terminals

All the terminal can do is send and receive characters. It's not very bright; so it's called a "dumb" terminal.

When you purchase the Radio Shack serial interface you also get a program that allows your TRS-80—complete with all its memory and disk drives—to function as a dumb terminal. You can use it to converse with other terminals over the telephone lines (through modems), or even to talk to a time sharing system or community bulletin board. But that's all it can do. Your personal computer remains a dumb terminal, with all its memory and data storage going to waste. All you can do is read what is sent out from the other end.

Herb Friedman, Tridac Electronics Corp., 588 Hewlett Street, Franklin Square, NY 11010.

On the other hand, a *smart terminal* allows you to use your computer as a computer even when it is working as a terminal. It will store information coming down the line, can transmit directly from memory, and it should be able to do some of the things your computer normally can do in conjunction with the terminal mode. At its best it should also throw in every feature you think you might ever need, and a few you haven't even thought of.

Most of the smart terminal software available for the TRS-80 falls in the first category—you get a few computer functions. Then there is *Omniterm*, which doesn't just make your computer smart, it makes it 'a genius'—an expanded computer terminal system capable of just about anything.

Omniterm is a package consisting of 15 disk programs including Basic, standard Backup (for single drive systems) and the TRSDOS 2.3 operating system. In addition to *Omniterm* itself, there are special operating modes for MicroNet and The Source, ASCII to binary conversion (and vice versa) and translation, which we'll get to later.

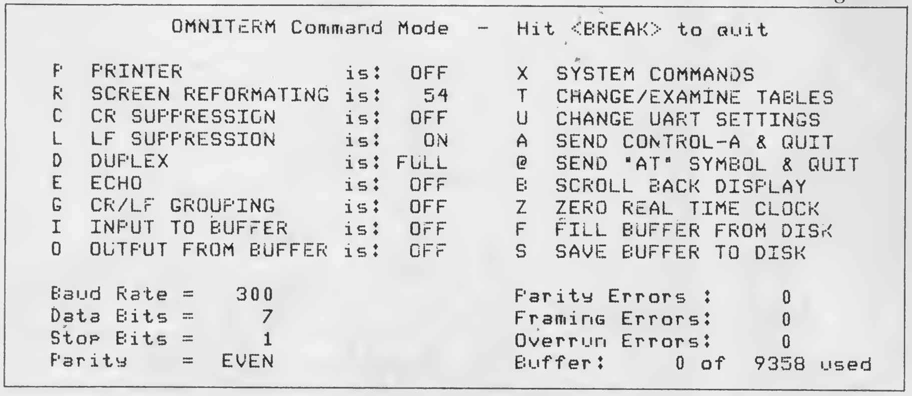
Using the Program

When *Omniterm* is loaded, it converts the TRS-80 into a smart terminal. A complete menu is displayed when the "@" key is pressed twice. The menu shows all the operating modes, the terminal conditions, total available buffer RAM and the amount used. Pressing a key directly enters the command without a Return. It is also easy to change the terminal conditions as shown in Figures 1-3.

For example, our version comes up at 300 baud, with 7 data bits, 1 stop bit, and even parity. The personal computer user we are talking to has a teletype terminal so we must configure for him. First, we press the U (change UART), then we enter the new parameters—which are displayed at the bottom right of the screen. Press Return, and the screen clears and displays our new terminal parameters, which are 110 baud, 2 stop bits, and no parity (parity off). (It is possible to save these terminal parameters until the next time a change is needed.)

Pressing a key while in the command mode (menu displayed) instantly changes the mode to the opposite of what is displayed on the screen. Pressing the P will cause the screen to indicate that the printer is on. The next time the P is pressed the printer turns off.

Figure 1.

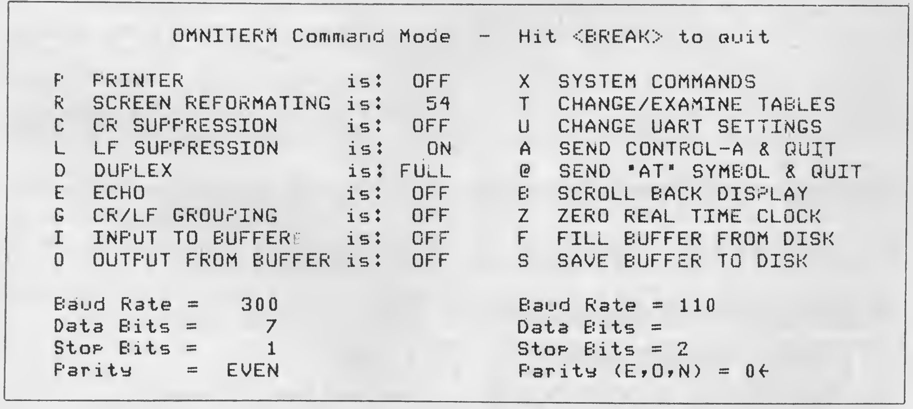


```
              OMNITERM Command Mode   -   Hit <BREAK> to quit

   P  PRINTER                is:  OFF      X  SYSTEM COMMANDS
   R  SCREEN REFORMATING is:    54      T  CHANGE/EXAMINE TABLES
   C  CR SUPPRESSION         is:  OFF      U  CHANGE UART SETTINGS
   L  LF SUPPRESSION         is:   ON      A  SEND CONTROL-A & QUIT
   D  DUPLEX                 is: FULL      @  SEND "AT" SYMBOL & QUIT
   E  ECHO                   is:  OFF      B  SCROLL BACK DISPLAY
   G  CR/LF GROUPING         is:  OFF      Z  ZERO REAL TIME CLOCK
   I  INPUT TO BUFFER        is:  OFF      F  FILL BUFFER FROM DISK
   O  OUTPUT FROM BUFFER     is:  OFF      S  SAVE BUFFER TO DISK

   Baud Rate =    300                      Parity Errors :      0
   Data Bits =      7                      Framing Errors:      0
   Stop Bits =      1                      Overrun Errors:      0
   Parity    =   EVEN                      Buffer:      0 of   9358 used
```

Figure 2.



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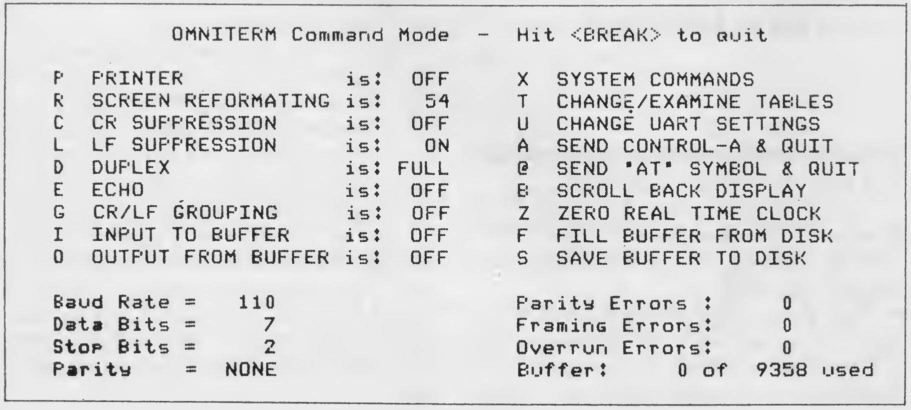
   R  SCREEN REFORMATING is:    54      T  CHANGE/EXAMINE TABLES
   C  CR SUPPRESSION         is:  OFF      U  CHANGE UART SETTINGS
   L  LF SUPPRESSION         is:   ON      A  SEND CONTROL-A & QUIT
   D  DUPLEX                 is: FULL      @  SEND "AT" SYMBOL & QUIT
   E  ECHO                   is:  OFF      B  SCROLL BACK DISPLAY
   G  CR/LF GROUPING         is:  OFF      Z  ZERO REAL TIME CLOCK
   I  INPUT TO BUFFER        is:  OFF      F  FILL BUFFER FROM DISK
   O  OUTPUT FROM BUFFER     is:  OFF      S  SAVE BUFFER TO DISK

   Baud Rate =    300                      Baud Rate = 110
   Data Bits =      7                      Data Bits =
   Stop Bits =      1                      Stop Bits = 2
   Parity    =   EVEN                      Parity (E,O,N) = O←
```

Figure 3.



```
              OMNITERM Command Mode   -   Hit <BREAK> to quit

   P  PRINTER                is:  OFF      X  SYSTEM COMMANDS
   R  SCREEN REFORMATING is:    54      T  CHANGE/EXAMINE TABLES
   C  CR SUPPRESSION         is:  OFF      U  CHANGE UART SETTINGS
   L  LF SUPPRESSION         is:   ON      A  SEND CONTROL-A & QUIT
   D  DUPLEX                 is: FULL      @  SEND "AT" SYMBOL & QUIT
   E  ECHO                   is:  OFF      B  SCROLL BACK DISPLAY
   G  CR/LF GROUPING         is:  OFF      Z  ZERO REAL TIME CLOCK
   I  INPUT TO BUFFER        is:  OFF      F  FILL BUFFER FROM DISK
   O  OUTPUT FROM BUFFER     is:  OFF      S  SAVE BUFFER TO DISK

   Baud Rate =    110                      Parity Errors :      0
   Data Bits =      7                      Framing Errors:      0
   Stop Bits =      2                      Overrun Errors:      0
   Parity    =   NONE                      Buffer:      0 of   9358 used
```

You can edit your programs into the Basic (or protocols) of the receiving computer before they are transmitted.

The command functions are virtually self-explanatory. CR SUPPRESSION, CR/LF GROUPING, etc., simply turn the auto line feeds and carriage returns on and off to accommodate different printers and operating modes.

For example, Radio Shack printers don't use a linefeed: it's automatically provided by the printer. Try to use a different printer, however and everything will overprint on the same line. The LF and CR commands simply straighten out the mess Radio Shack has designed into their system.

ECHO is very convenient for the person with whom you are communicating. If your computer is talking to a timesharing system, you have no problems. But what if you are hooked up to another small computer? There is no way your friend can tell if his signals are getting into your computer. But if the ECHO is turned on, your computer transmits back down the line whatever it has received, just as if it were the time sharing host computer.

SCREEN REFORMATTING does just what it says; it configures your screen line length to match your printer.

The input and output buffer commands allow you to exchange programs or data through a modem or a direct connection to another computer.

It works this way: Assume you want to

feed a program to another computer. You load a disk file into the buffer through the input mode using command "F" (FILL BUFFER FROM DISK). Then you set the buffer for output. The instant you press the O key, the buffer is transmitted from the terminal. If you want to receive a program, you set the buffer for input, which loads whatever is received. Then you use the S (SAVE BUFFER TO DISK) command, which will ask for a standard TRS DOS filespec and then save to disk.

If you are connected to another TRS-80 computer you can exchange programs using the direct binary information from the TRS-80 disk or memory. But if the computer at the other end isn't a TRS-80 it will not be able to read data. In this case, the data or information exchange must be in ASCII. *Omniterm* provides the conversion programs—from ASCII to binary and vice versa—in the software package.

A built-in editor, TEXTED/BAS, allows you to edit input and output data. Assume you are swapping programs with a Zenith computer. Your Basics are similar, but not exactly the same. A wrong command here or there can cause the program to bomb. With *Omniterm* you can receive the Zenith program, edit it to remove or change unfamiliar Basic statements or commands, and then save a usable version.

Similarly, you can edit your programs into the Basic (or protocols) of the receiving computer before they are transmitted. (We have even connected a Zenith/Heathkit H89 computer directly to our TRS-80 in order to swap programs, which normally can't be done because, among other things, the disks are not compatible.)

Omniterm's translation feature is really what makes the terminal "super intelligent." One of the problems in using terminals is there is really no such thing as standard ASCII.

Worse, still, are the unmodified IBM terminal/printers which use IBM EBCDIC code rather than ASCII, which causes the IBM printer to create garbage from straight ASCII input.

Omniterm solves this problem by providing user programmable translation tables for every individual operating mode. For example, you can translate only the printer output to convert ASCII to EBCDIC for an IBM printer.

In Conclusion

We have only touched the highlights of *Omniterm*. Suffice it to say that we consider *Omniterm* among the very finest, if not the finest smart terminal program for the TRS-80.

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CIRCLE 196 ON READER SERVICE CARD

Take Command of Your TRS-80

C.A. Johnson

creative computing
SOFTWARE PROFILE

Name: Command Processor
Type: System utility
System: TRS-80 Model I or III
Format: Tape (Model I), Disk (Model III)
Language: Machine language
Summary: Helps create executable files of DOS commands
Price: $20 (Model I), $30 (Model III)
Manufacturer:
Racet Computes, LTD
1330 N. Glassell, Suite M
Orange, CA 92667

One of the handiest programs I have seen lately, for general utility, is *Command Processor (COMPROC)* from Racet Computes. It handles repetitive or semi-repetitive set-up chores so well that it has taken all the drudgery out of initializing my TRS-80 for all the activities I do regularly.

A command processor is a program which will execute a series of DOS system commands. *COMPROC* will execute Basic and a series of Basic commands as well. The user creates a command file for each sequence of operations he wishes COMPROC to execute for him.

The command file is a short Basic program, consisting of REM statements which perform such tasks as setting memory size, loading programs, attaching data files, setting debounce, calling upper/lower case drivers, etc. It can easily be used to generate a menu for each disk which can be used to select a desired program and execute it. This is a nice feature for game disks, which may be used by family members and friends who do not know the loading procedures of the various games.

I had a terrible time trying to remember tó set memory size and I always had to look it up. Putting the memory size in the command file that loads and executes a program solves that problem nicely.

I had tried to get my wife interested in my TRS-80 on numerous occasions. I put her recipe file on disk, set up a reference file for addresses and telephone numbers, and even tried to get her to use the word processing capability for writing letters. Each time we tried, a few syntax errors would introduce enough frustration to discourage her from continuing. *COMPROC*, to a large extent, overcame that problem.

I set up a series of command sequences to load and initialize some of the files she would most like to have available. Her files are on both sides of two disks, clearly labeled.

Now all she does is select and insert the disk she wants to use into the drive and turn on the computer. The AUTO command enters "COM MENU" and *COMPROC* does the rest. It loads and executes the command file, displays the menu, accepts her choice, asks for other input, if appropriate, loads the program which controls the file activity, and loads the file. All she needs to know is what she wants to do. It took the fear of the computer away and made a user of her.

COMPROC is executed with the command "COM." If executed without a file being specified, it will immediately ask for a filespec (the name of the file containing the command sequence).

The user can, and I usually do, include a space and the filespec. Since *COMPROC* requires that the command file have the extension, "CMF," the command filespec can otherwise have the same filename as the program. This is convenient, and reduces the need for remembering which command file goes with which program.

Optimal Parameter Fields

COMPROC provides for the insertion of optional parameter fields located in the command sequence with the code ?n?, where n is a relative parameter field number. These parameter fields may be supplied by the user in response to the command sequence prompts or supplied in the "COM" statement following the command filespec, separated by spaces.

C.A. Johnson, 3619 Sugarhill Dr., San Antonio, TX 78230.

In the latter case, *COMPROC* will pick them up in sequence as needed. For complex operations, up to nine parameter fields may be specified. In addition, the last line of the user's command file may contain another "COM" statement, which provides for practically unlimited capability.

Nine keyboard functions can be included in the text of the command file to provide user input, pause, break, clear, the four arrows, and an exit from the command sequence.

Documentation

The manual is well written and easy to read. Initially, I was not prepared for the true power of the program. I had assumed that it was an extension of the "AUTO" command. As a result, I tended to read into the text less than was actually there. Once I accepted the program for what it really is, I followed the manual readily, with one "Wow!" reaction after another as I progressed through it.

I am finding *COMPROC* exceptionally easy to use. Racet, it appears, has not overlooked anything in its design.

COMPROC will save you enough in time and frustration to pay for itself in practically no time.

Hardly a week goes by that I do not find a new, exciting application for it. I feel much like I did when I encountered the first compiler (FORTRANSIT) for the IBM 650 back in 1959, and no longer had to program in machine language.

COMPROC is delivered on cassette for Model I and on disk without an operating system for Model III. Both load easily on disks with a TRSDOS operating system with all utilities. On Model III, I use it with TRSDOS. On Model I, I use it with TRSDOS 2.3 and with NEWDOS as well.

The manual states that, when used with NEWDOS, "APPARAT" must be specified in the first line of the command run stream, but I have found that in most instances it will work just as well without it. It works well with either Model I or Model III and with either operating system.

The Model I version sells for $20; the Model III version for $30. In either case, it is well worth the money. It will save you enough in time and frustration to pay for itself in practically no time. Once you have it, you will never want to be without it.☐

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CIRCLE 204 ON READER SERVICE CARD

Where Is Star Trek?

C. A. Johnson

creative computing
SOFTWARE PROFILE

Name: Discat
Type: Catalog utility
System: TRS-Model I or III, Disk Drive
Format: Disk
Language: Machine Language
Summary: Helps keep track of large software libraries.
Price: $50
Manufacturer:
Racet Computes, Ltd.
1330 N. Glassell, Suite M
Orange, CA 92667

I had 110 diskettes. My cataloging system was a mess. I could not find anything, except the programs or text I had been working with most recently.

I had printed out the directories of the diskettes, but that did not help very much. To search 220 pages of index was a chore I did not relish at all.

It was not at all difficult to get into this mess. For the first 16 months, my system was tape-oriented. During this time I was accumulating games, utilities, business records and programs, and text for articles and short fiction. All of these were on cassettes.

When I got my disk drive, I started loading all of my programs, records, and text onto disk. With as many cassettes as I had it seemed that I would have to make a career out of the conversion process. So, after several hours of waiting for tapes to load, I decided to convert things as I needed them. As long as I had only a few disks, it was no problem to check to see if I already had a particular file on disk.

Eventually, however, I began to rely on my memory. If I could not remember converting a file, or if I could not find it fairly quickly, I would make a disk copy from cassette. This resulted in complete disorganization in my disk file and numerous duplicated files. Both of which compounded my problem.

Discat came to my rescue. I found *Discat* a delight to use. It is not delivered on a disk with an operating system, but it loads easily to a 35-track TRSDOS disk with all of the utilities. Once on a disk with an operating system, it can be transferred to your favorite system.

I converted mine to a NEWDOS disk and killed all nonessential utilities. It gave me 58 tracks for *Discat* and the indexes. *Discat* requires 8 granules, leaving 50 tracks available for index files. Actually,

Figure 1. Discat Main Menu.

```
* CURRENT INDEX = GAMES#1        DISKS = 3       PROGRAMS = 56    *
*                                                                 *
*          0 - DISPLAY CATALOG OF INDEXES                         *
*          1 - PROGRAM / DISK SEARCH MENU                         *
*          2 - DISPLAY DISK FREE SPACE                            *
*          3 - CREATE (OR UPDATE) INDEX                           *
*          4 - DISPLAY THE CURRENT INDEX                          *
*          5 - PRINT THE CURRENT INDEX                            *
*          6 - SORT THE CURRENT INDEX                             *
*          7 - EDITING MENU                                       *
*          8 - SPECIAL UTILITIES                                  *
*          9 - SAVE THE CURRENT INDEX TO DISK                     *
*                                                                 *
*                                                                 *
```

C. A. Johnson, 3619 Sugarhill Dr., San Antonio, TX 78230.

that is almost immaterial, since index files can be stored on disks without the *Discat* program.

Documentation

The documentation is easy to read, and contains a series of exercises for demonstrating the various search features and displays provided by the system.

By the time I had completed the exercises, I felt that I had a good understanding of the program and how it worked. I did not know it at the time, but I did have one misconception which was to bother me when I began to catalog my own disks.

Loading the program brings up the main menu (Figure 1). The "0" key switches to the index menu (Figure 2) and back. Selections from the main menu generally display sub-menus as appropriate. The notable exception is the DISPLAY DISK FREE SPACE option. It lists the disk numbers and the number of granules of free space on the front and back of each disk.

Sorting

The program itself provides for nine indexes, allowing you to separate your files into index categories, such as, games, business, utility, home, word processing, etc. Once established, each index and its associated file are treated as a separate file and any of the search and display options can be executed against whichever file is in memory.

Since the index file is totally in memory, all searches and displays are very fast. The sort is undoubtedly the fastest I have ever seen. The documentation states that "On a 32K TRS-80 System, a sort of over 800 records was completed in less than 30 seconds. On a 48K System, over 1900 records were sorted in less than 70 seconds." I did not try to replicate their test, but the tests I ran convinced me that they are not exaggerating.

On a search for a specific program name, the program provides for masking capability, but masking characters do not have to be provided. Specify the first character or characters and the program will return all file names which meet the conditions specified. In this regard, the program is exceptionally parsimonious with key strokes. Except for inputs which involve multiple character entry, the keyboard is "live." Menu selections, for example, are executed when the number key is depressed.

Cataloging

At the time I started cataloging my own disks, I was under the impression that the index categories must be decided upon and set up in the program in advance. The documentation implies this, but it is not true.

When I searched the menus for an option to name my categories, it just was not there, so I decided to proceed without any categories established. I entered two disks and selected the option to SAVE THE CURRENT INDEX TO DISK. I was provided a modified index menu with the request for me to name the index. Suddenly, it all became clear. I specified a name and the program assigned the name to the first index file and wrote the catalog entries to disk. I repeated the process with samples from my other categories and everything worked as it should.

The entire index for the category being worked with is held in RAM, so there is no swapping of the *Discat* disk and the target disk during the process of entering disks into the catalog.

The size of your RAM determines the maximum number of directory entries you can have in any single index. For a 32K RAM system, over 800 entries can be contained in each of the nine indexes, for a total of 7200. For a 48K RAM system, over 1900 entries can be included in each of the indexes, for a total of 17,000. To index the maximum number of entries would fill up to five diskettes with data.

Figure 2. Discat Index Menu.

```
* CURRENT INDEX = GAMES#1        DISKS = 3       PROGRAMS = 56    *
*                          CATALOG OF DISK INDEXES                *
*                     <*>  -  INDICATES EMPTY                     *
*              1.   *                                             *
*              2.   *                                             *
*              3.   *                                             *
*              4.   *                                             *
*              5.   *                                             *
*              6.   *                                             *
*              7.   *                                             *
*              8. GAMES#1                                         *
*              9. BUSINESS#1                                      *
*              0. RETURN TO MAIN MENU                             *
*                                                                 *
```

As each disk is entered for the first time, the program writes the disk identification number and whether front or back on the disk as part of the cataloging process. Later, when an update is required in the catalog, the appropriate index is loaded, option 3 is selected from the main menu, the disk is inserted into the drive, and the 1 option (automatic update) key is depressed and the program does the rest.

One caution here: the program does not check for duplicate disk numbers. If you use the same number twice in the same index, the second disk will replace the first and the first will be lost to the index. However, there is a utility for changing the disk number on the disk, after which it can be reentered with the new number.

Disks without operating systems cannot be put into the index using the automatic features of the program. The program cautions against trying to catalog such disks and provides options for manually entering and updating them.

With my disorganized disk file, I found one feature of particular value. When the disk is entered into the index, the option of including or not including it in the index is given. Normally this question is answered "Y" or "N," in which case the entire disk directory is entered into the directory, or not, as appropriate. However, if the answer is "S," the program displays each file name in turn and the "Y" or "N" option can be specified file by file.

Thus, you can have the same disk entered in several indexes, but only those files pertinent to each index would appear in response to searches and displays.

Printouts from *Discat* start printing in the first column. Many printers do not have the capability to move the paper to provide a margin on the left. For those users, there is no way to get printouts which they can punch to keep in a notebook. My opinion is that programs of this type should provide a left margin for this purpose.

I use a 48K TRS-80 Model I, Level II, with one disk drive, and a 48K Model III with two disk drives. *Discat* claims to work on both Model I and Model III. As it turns out, there are two versions of *Discat,* one for Model I and another for Model III. When you order, you should specify which version you need.

Discat is an excellent program. It is available from Racet Computes for $50 and it is well worth the money.

This program provides the kind of information you need to reorganize your disk library with the greatest efficiency. By the time you read this article, I will have made full use of the power of *Discat* and my disk files will be well organized and orderly. By the way, *Startrek* is on disks number 9F, 14F, 16B, 21B, 27F, 39B, 44F, 64F, 72B, 89B, 95B, and 101F. ☐

Inexpensive Backup for TRS-80 Disks

David A. Hinton

creative computing
SOFTWARE PROFILE

Name: Dumpload
Type: Disk-to-tape backup utility
System: Model I TRS-80, Disk drive
Format: Disk or Tape
Summary: Valuable tool for backing up disk libraries.
Price: $16.95 on tape, $19.95 on disk
Manufacturer:
Complete Computer Services
8188 Heather Dr.
Newburgh, IN 47630

Many utility programs have been written and sold for the Model I TRS-80. Most of these are well-thought-out pieces of software that fill the programmer's needs, and a few of them can even be classified as excellent. Dumpload, created for users of disk-based Model I systems, is one of the newest entries into the utility software marketplace and it, too, deserves to be called "excellent."

Any experienced programmer knows the importance of making backups of the frequently used and valuable disks in his library. Some people, myself included, don't feel safe unless they have backups of their entire library. As the program library grows, having a duplicate set of disks soon becomes a very expensive practice. Some programmers resort to using less costly cassettes to make backup copies of seldom used programs, but this is usually a tedious process and does not work well for all types of software.

Any experienced programmer knows the importance of making backups.

Getting Started

Dumpload allows you to make cassette backups of your disk library—but without the usual hassle. It can copy anything and everything (e.g., DOS, data, word processor files, Basic, Fortran, Pascal, assembly code, object code, etc.). The command options allow the user to copy only a certain track, a group of selected tracks or the entire floppy. When making a complete disk backup to cassette, the process is fully automatic even for one-drive users. No more swapping disks in and out of the drive. Just load the desired floppy, load a blank tape, initialize Dumpload and walk away.

This utility can be purchased on cassette or disk. I ordered the cassette version and received it in about 10 days. The instructions which accompany Dumpload cover the use of both the tape and disk versions. Procedures are included to place the tape version on a disk for easier access or copy the disk version to another disk. Dumpload will work with TRSDOS 2.3 or NEWDOS80 without modification.

A Choice of Speeds

When Dumpload is loaded, it begins by asking if you want to use the standard 500 baud tape speed. What's this, a choice? That's right, the program is capable of backing up a disk to tape at the standard Radio Shack cassette speed of 500 baud or at an optional high speed of about 1800 baud. At 1800 baud, a 40-track disk can be saved on less than 10 minutes of tape.

The written instructions point out that you will have to run at 500 baud if your keyboard contains the Radio Shack XRS-2 cassette modification. If you have this modification, indicated by a keyboard serial number ending with a dash one (-1), don't give up on using the high speed. Another set of instructions included in the Dumpload package gives all the information needed to install a bypass switch which will allow you to enable and disable the XRS-2 modification at will. (This is the same modification required to use B17 sold by ABS Suppliers).

David A. Hinton, R.R. 3, Box 44B, Rockport, IN 47635

If you prefer not to mount a switch in your keyboard case or you don't have a switch immediately available, the instructions also describe how to disable the XRS-2 circuit temporarily. Neither of these modifications requires any circuit board traces be cut.

Easy to Use

After the tape baud rate question is answered, an introductory message and a menu of three options are displayed on the screen.

Option 1 dumps the disk, which must be in drive 0, to tape. All you have to do is load a blank cassette, set the recorder for record mode and answer the questions displayed on the screen. You are first asked the starting track number.

You may start with any track you desire. Pressing "enter" without giving a value defaults to an answer of 0.

You are then asked, "How many tracks on this diskette?" Pressing "enter" gives a default answer of 35. If your disk contains more than 35 tracks, or you only want to dump a few tracks, you can indicate this by typing "40" or the number of the last track you want to dump.

> ***My article was recovered safe and sound in about one minute, thanks to Dumpload.***

Option 2 will restore the Dumpload tape to a disk. All you need to do is load the recorded tape in the cassette recorder, set it for play mode and load any formatted disk in drive 0. The tape contents will then be placed on the disk with each track being restored to its original position without any further action from you. If a checksum error is encountered, the recorder will stop. You can then choose to rewind the tape to the blank area preceding that particular track record and try Option 2 again, restore the track to disk with the checksum error or discontinue the restore attempt.

Option 3 permits you to verify that you have made a good tape. It will read the tape records, looking for checksum errors, but will not write to the disk.

Options 4 and 5, which allow you to exit Dumpload, are mentioned in the written instructions but are not displayed on the screen. Option 4 will return you to DOS Ready, and Option 5 will reboot the system.

How It Works

Dumpload creates a record or series of records on the cassette tape with each record constituting one disk track. The records are separated from each other by a blank area of tape which enables you to position the cassette at the beginning of any desired track record manually. A checksum value is computed for each disk track as it is processed before it is sent to the recorder. This checksum value and the track number become part of the actual record stored on the tape. Therefore, when a track record is being restored from tape, the computer can verify that the tape record is good and where that particular track record is to go on the diskette.

A Personal Experience

I wrote this article using my TRS-80 as a word processor. The article was about half finished, when the power company provided me with a two-second interruption in service.

My first thought was to congratulate myself for having just saved a current copy of my file to floppy. I then rebooted my disk. The drive motor clicked into action but nothing happened. The motor timed-out and stopped. I tried again and got the same results.

That's when I had my second thought: "Oh no, it's gone!" I inserted a different disk, booted, and everything worked perfectly. "Well, that's it. I have lost my article and all the other files on that disk, I thought. But wait, it acts like track zero is glitched and that might be the only problem." Since Dumpload can copy and restore a single track, I figured I might as well give it a try.

I loaded Dumpload, inserted a good disk into the drive, and a blank cassette into the recorder and dumped track 0 to tape. I rewound the tape, inserted the glitched disk into the drive, and loaded track 0 on the disk. I then booted the disk and was back in business again. My article, along with all my other files, was recovered safe and sound in about one minute, thanks to Dumpload.

Conclusion

Dumpload is highly interactive, and, therefore, is easy to use, even for the beginner. Once an option to save or restore a disk is chosen, it is as fully automatic and convenient as making a backup using two floppy drives. I have found it to be a very simple, inexpensive way to protect my large library of disks.

Dumpload is available from Complete Computer Services, 8188 Heather Dr., Newburgh, IN 47630. It is sold on cassette for $16.95 or on disk for $19.95. If you send them a disk containing TRSDOS 2.3 or NEWDOS80, they will install Dumpload on your disk, return it and charge you only $15.95. ☐

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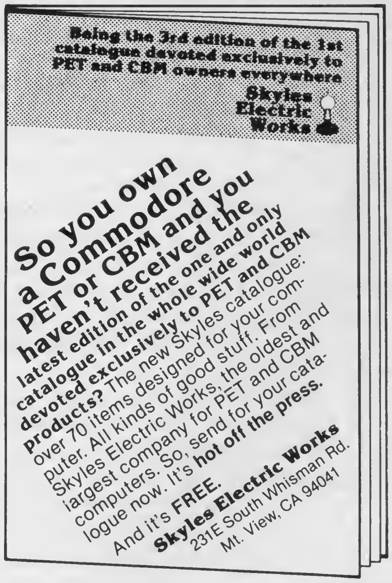
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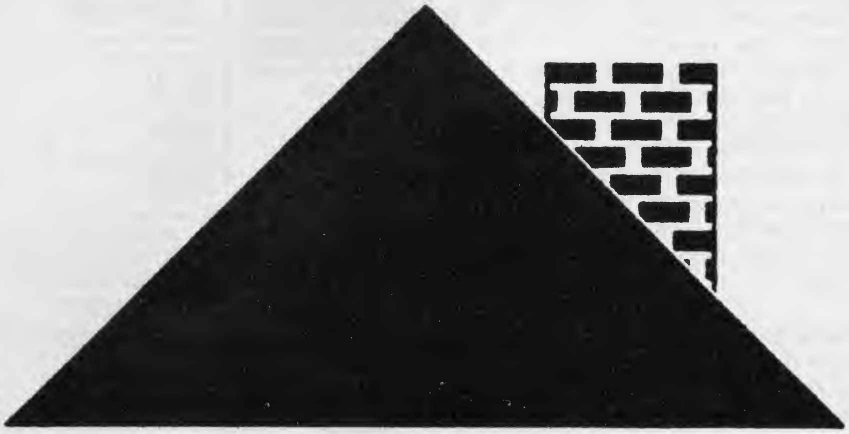


Home Financial Decisions for the TI 99/4

Irving Rowe

Until a few weeks ago, I had no interest in computers or in programming. All I knew about computers was that when I got a bill from a store which contained an error, it was devilishly difficult to get it corrected.

All that changed suddenly when I was given a TI 99/4 home computer as a surprise gift. Suddenly I burned with a fervor to utilize it to the hilt and to learn how to program it.

When I looked through the Beginner's Basic manual which came with the machine, I felt sure that I would have no difficulty in learning the language, but it would take me some time to become fluent in it. What to do to get started sooner?

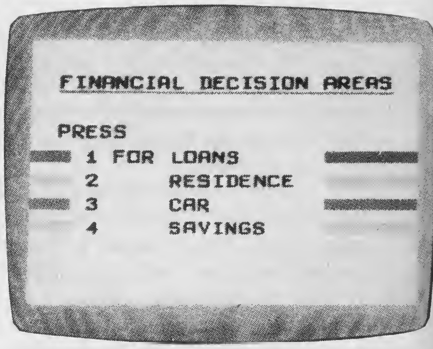
I decided to obtain one of the TI Solid State Software Command Modules so that I could quickly use the computer. The *Home Financial Decisions* module seemed like a good one with which to start, since the calculations that it performed should be useful to everyone.

When I plugged the module into the machine, I found that it took over complete control of the computer. This will probably not surprise any of the readers of this magazine, but at first I was a bit miffed that I could not use any of the Basic commands in combination with the module program.

Nevertheless, I proceeded to investigate what the module could do. I found that *Home Financial Decisions* covers four major areas: Loans, Savings, Residence and Car. Each of these areas has from four to six different programs, for a total of 21 individual programs.

I was not convinced that it would be easier to use than a hand-held calculator.

Some of the programs in the Residence and Car sections involve comparisons of different choices and permit analyses over different periods of time. In order to permit a fair comparison of these different conditions, all of the resulting figures are automatically reduced by the module program to present value, the amount of money which, if invested today at a given rate of interest (either in a savings bank or other type of available investment) would equal the value of a financial transaction at the specified future time.



```
FINANCIAL DECISION AREAS

PRESS
  1 FOR LOANS
  2     RESIDENCE
  3     CAR
  4     SAVINGS
```

I must admit that I approached the use of the *Home Financial Decisions* with a certain amount of skepticism. Since this was the first time I was about to use the computer, I was not sure how accurate the results would be, nor was I convinced that it would be easier to use than a hand-held calculator. Several years ago, in my pre-computer days, I had purchased an inexpensive hand calculator, the TI Money Manager, which is pre-programmed to calculate annuity and compound interest

---

Irving Rowe, 35 Ridge Drive, Port Washington, NY 11050.

problems. I worked out numerical solutions for each of the 21 programs in the *Home Financial Decisions* module and then compared the results obtained by using the Money Manager.

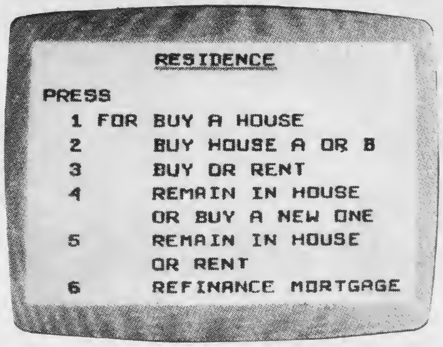
The first four programs in the Loan area of the module yield (a) the amount of money you can borrow at a given interest rate if you specify the size and number of monthly payments you are willing to make; (b) the size of monthly payments required to repay a given loan in a specified number of months; (c) conversely, the number of months required to pay off a loan if you indicate the size of each monthly payment; and (d) the size of the down payment which is needed for a particular purchase if you specify both the size and the number of monthly payments to be made.

I found that I could do the same calculations on my hand-held calculator almost as quickly as with the computer, since these are relatively simple compound interest problems.

The fifth program in this area tells the user how much money is needed to pay off a loan early, before the specified number of payments has been made. This requires two separate operations on the Money Manager, so here the computer clearly has the advantage. Furthermore for each of these programs the computer gave the total amount of interest paid under the indicated conditions. This would have been another operation on the calculator. I obtained the same answers with both devices.

The Savings area of the module solves four problems: (a) how much money will accumulate in a savings account, given the present balance in the account and a given number of regular deposits when the annual interest rate and rate of compounding interest is known; (b) how much must be deposited each year to accumulate a given amount of money in a given length of time; (c) how long it will take to reach a financial goal if the other factors are indicated; and (d) how much money must be deposited in a savings account to permit a regular series of withdrawals to be made before the account is exhausted. The last program is really an annuity calculation. As in the case of the Loan area, these saving programs are very useful, but I could solve the problems quite easily on the Money Manager calculator.

The Residence section of the module gives analyses related to (a) buying a house; (b) the relative costs of buying house A versus house B; (c) the financial advantages of buying a house versus renting one; (d) the comparative cost of remaining in your present house versus buying a new one; (e) the comparative cost of remaining in your present house versus renting a house or apartment; and (f) the cost of refinancing the mortage on your present house.



```
          RESIDENCE

PRESS
  1 FOR BUY A HOUSE
  2     BUY HOUSE A OR B
  3     BUY OR RENT
  4     REMAIN IN HOUSE
        OR BUY A NEW ONE
  5     REMAIN IN HOUSE
        OR RENT
  6     REFINANCE MORTGAGE
```

When I first performed one of these analyses and compared the results I obtained on the hand calculator, I found serious discrepancies. I soon discovered that the computer module performed a more sophisticated analysis and took more factors into account than I had considered. For example, the computer module considered not only the cost of the mortgage, but also the cost of utilities, insurance and property taxes. It also takes into account the savings due to income tax deductions for mortgage interest payments and for property taxes. Futhermore it shows the effect of an assumed rate of inflation on the future market value of the house and it indicates the owner's equity in the house at any given time.

The final section of the module deals with the purchase and cost of owning an automobile. As is the case for the Residence area, there are six separate programs: (a) the cost of buying a car (b) comparison of buying car A or car B; (c) a comparison of the cost of leasing versus purchasing a car; (d) a comparison of the cost of keeping your present car versus buying a new one; (e) a comparison of the cost of keeping your present car versus leasing a new one; and (f) the amount needed to pay off the loan early, and the total amount of interest paid up to that point. The last program is identical to the "Early Payoff" in the Loan area of the module.

These programs are about as complicated at those in the Residence group. However, here the programs consider depreciation instead of appreciation. The programs also factor in maintenance costs, insurance and the tax savings due to interest payments. The resale value of the automobile is also considered. These factors cannot be predicted accurately, so to this extent, the results of these analyses are estimates rather than exact calculations.

In summary, I believe the *Home Financial Decisions* module is very valuable if you are interested in the costs of owning or purchasing a house. It is perhaps even more valuable in considering the costs involved in purchasing or leasing an automobile, since this is likely to occur more often. If even a very small fraction of the cost of either of these large expenditures can be saved through these calculations, it will more than pay the $29.95 price of the module. The Loan and Savings program are also useful but they do not provide as clear-cut an advantage over a hand-held calculator, particularly one which has financial functions programmed in. It would be useful for a real estate office where the displays in the Residence section could be used to help customers choose between available houses.

Texas Instruments, P.O. Box 53, Lubbock, TX 79408. ☐

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"Hi, Frank Carter's the name, data's my game!"

Apple Graphics Utilities

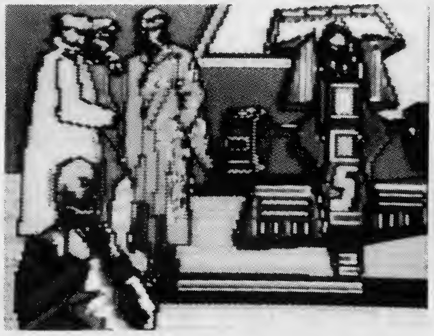
David Lubar

Back in the early days of the late seventies, very few people could cope with placing graphics on the Apple. We all knew it was possible, but the prospect of creating shape tables by hand was enough to dampen anyone's spirits. The picture began to brighten with the appearance of graphics utilities. *Creative Computing* published a shape table generator written by Gary D. Dawkins. Steve Wozniak of Apple furnished a shape-table program in his **Wozpak**. These programs not only allowed easy design of shapes, they also stored a series of shapes in a table, taking a major element of drudgery out of programming. Now, there are many graphics utilities on the market. Four of these programs are covered below.

Local Color

Bob Bishop, who is to Apple graphics what Wilbur and Orville were to flight, has moved the coloring book into the computer age with *Micro Painter*. The system allows you to fill in hi-res pictures with twenty-one colors. The disk includes eight drawings. When the program starts, you select a picture, either from the disk or from any disk with a drawing on it. The picture is placed on the screen, along with a flashing crosshair controlled by paddles. Colors are selected with two keystrokes. Normal blue is BB, light blue is LB, dark blue is DB, and so on. Once a color is selected, a push of the paddle button causes an area to be filled. The color spreads out in a diamond pattern, stopping whenever it encounters a black line. Once an area has been colored, it can't be easily recolored. The paint mode only functions against a white background. Colored pictures can be saved on disk.

Since most drawing programs and graphics tablets produce a white line on a black background, Bishop has included a command which produces a negative of the screen. Thus you can draw with any graphics program, save the picture, bring it back under Micro Painter, and reverse the colors to obtain black lines on a white background.


Drawing by Saul Bernstein on *Micro Painter*.

Micro Painter also has a microscope mode which expands the picture to seven and a half times normal size. In this mode, you can examine and change individual pixels. This is handy for patching up small, enclosed areas that can't be filled in the normal mode.

It seemed to me that Micro Painter would be an ideal program to get people interested in computers. It is easy to use, fun, and produces immediate, observable results. A friend, who had very little computer experience, tried the program and had no difficulty following the instructions, which are clear and well written. She was, however, very amused by the microscope mode and the line in the instructions which said, "The Paint Brush and the area around it have been magnified seven and a half times!" After she stopped laughing, she explained that the microscope she uses at work has a resolution of 100,000X. Her amusement quickly gave way to absorbtion as she went on to color several drawings.

For beginners who want to have a new kind of fun with the Apple or advanced programmers who need to color pictures, Micro Painter is an excellent program. The instructions also include a short program in Applesoft which allows you to draw with the paddles.

creative computing
SOFTWARE PROFILE

Name: Micro-Painter

Type: Color-fill Program

System: 48K Apple II or II Plus, Disk Drive

Format: Disk

Language: Integer or Applesoft Basic and Machine Language

Summary: Electronic coloring book

Price: $34.95

Manufacturer: Datasoft, Inc.
19519 Business Center Dr.
Northridge, CA 91324

Penguin Graphics

Mark Pelczarski (alias the Magic Penguin), a very talented Apple programmer, is the author of two graphics packages. *Magic Paintbrush 4.0* contains programs for drawing on the screen and for developing shape tables. There are three drawing modes. The line mode draws a line between any two points. By holding down the paddle button as you move the cursor, you can obtain curves. The fill mode also draws lines, but keeps a constant origin for the lines, allowing you to fill in an area with a series of lines. The paint mode provides a choice of nine brushes with which to paint lines or fill background. Since these brushes are stored as a shape table, the user can define his own brushes.

The shape creation routines are very nice. There are two modes, Quickdraw uses the paddles and is designed to be fast but not accurate for intricate shapes. The shapes are designed in lo-res, but can be viewed at any time on the hi-res screen. While viewing them, the paddles control scale and rotation. The other method uses keys to plot the shape. While plotting, the scale and rotation can be changed using the paddles. This is a very versatile system. For instance, you can start with a scale of four, where each point is plotted four times, then shrink the shape. The ability to alter the shape in mid-plot allows a great deal of control over the final product.

creative computing
SOFTWARE PROFILE

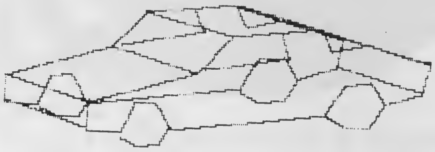
Name: Magic Paintbrush 4.0
Type: Drawing and Shape Utility
System: 32K Apple with Rom Applesoft, Disk Drive
Format: Disk
Language: Applesoft
Summary: Good for designing shapes
Price: $29.95
Manufacturer: Co-Op Software
P.O. Box 432
West Chicago, IL
60185

As a bonus, the disk contains five games using shapes that were created with the Magic Paintbrush: Applesoft Invader, Slot Machine, Collision, Dogfight, and Sailboat Race. The Slot Machine program is nicely done. The Invader game is rather slow, but has a hilarious ending. Collision is a good simulation of the arcade game. The games are in Basic, and don't run as fast as machine-language versions, but they make a nice extra for the package.

creative computing
SOFTWARE PROFILE

Name: The Complete Graphics System
Type: Drawing, Shape, and 3-D Utility
System: 48K Apple with Rom Applesoft, Disk Drive
Format: Disk
Language: Applesoft and Machine Language
Summary: Excellent 3-D utilities, good shape creator
Price: $59.95
Manufacturer: Co-Op Software
P.O. Box 432
West Chicago, IL
60185

If you take *Magic Paintbrush*, add three dimensional graphics routines, color fills, hi-res text, and other graphics routines, you'll have Mark Pelczarski's *Graphics System*. The three-dimensional utilities verge on the phenomenal. A figure can be rotated through any dimension, distorted, moved, or scaled. You can experiment with the two figures provided on the disk or create your own. Different figures can be placed on the screen and be manipulated separately. Two-dimensional shapes can be constructed using the panel utility, then be brought into the 3-D section where vertices can be joined. The distortion subroutines were the most fascinating. Any vertex of the figure can be stretched or shrunk through left/right, forward/back, or up/down distortion. At any point, the figure can be edited, changing the length of any of the lines, or changing the connections of the vertices. It takes a few minutes to get used to the routines for creating figures, but they are well constructed. Overall, the entire 3-D set is graced with easy input routines.



A 3-D Image by Mark Pelczarski.

The disk includes a program that shrinks a hi-res picture into one quarter of the screen. I should also mention that while the color-fill routines are not as effective as those in Micro Painter, and sometimes require several fills to cover the desired area, they do allow for over 100 colors.

Shape Up

Shape Master from **Sensational Software** is a utility specifically designed for creating and manipulating shape tables.

creative computing
SOFTWARE PROFILE

Name: Shape Master
Type: Shape Utility
System: 48K Apple with Rom Applesoft, Disk Drive
Format: Disk
Language: Applesoft
Summary: Complete utility for creating and altering shape tables
Price: $24.95
Manufacturer:
Creative Computing Software
P.O. Box 789-M
Morristown, NJ 07960

Shape creation is executed on hi-res grids, allowing each point to be seen in an expanded size. The user has a choice of five plotting grids, from 13-by-23 to 39-by-69, and two methods of plotting. The vector method consists of moving a cursor through the grid, and indicating which points on the path should be plotted or not plotted. This works along the lines of the traditional method where the programmer defines a series of vectors and indicates which points on the path should be plotted. At any time, you can reverse the moves, deleting the series or part of the series. The graph method allows for more flexibility. Here, individual points on the grid can be selected for plotting. Once all the desired points are chosen, the program constructs a table entry for the shape. This frees the user from worry about drawing the shape as one continous series of points. Shapes created previously can be brought into this mode for editing.

Once shapes have been created, they can be saved to a table or displayed. An entire table can be displayed, or individual shapes can be seen, scaled, and rotated. Adding to the utility of the program, any shape or group of shapes in a table can be reversed, giving a mirror image. These reversals can replace the original shapes or be appended to the table. Also, shapes within a table can be shuffled.

The authors, Doug Green and Matt Clark, have included four games and two graphics demos on the disk. The games are slow, but give good examples of what can be done with shape tables. The demos are superb. One shows a front or side view of an Atat walker from *The Empire Strikes Back* clumping along the screen. The other shows a Tie Fighter which can be rotated through three dimensions as it moves. The instructions are clear and thorough, covering all aspects of the program, and explaining how to use shapes in other programs.

End of the Rainbow

Obviously, each of the above programs has different virtues and flaws. *Micro Painter* is the best for filling areas, and the microscope mode allows for fine detailing. If you already have a good drawing program and shape-table creator, *Micro Painter* is the way to go. *Magic Paintbrush* has an excellent shape creator, and the use of definable brushes adds a lot of flexibility, but the fill routines are awkward. *Graphics System* offers a good variety of utilities, including excellent shape table routines, and is the only one of the above which includes 3-D utilities. However, it is expensive, and designed for the serious programmer who has need of these tools. *Shape Master* is designed strictly for shape tables, with no drawing routines, but it handles its functions very well. If your main concern is designing shapes for use in other programs, *Shape Master* has a lot to offer. Depending on what you already have, and what your prime needs are, each of these programs has something to offer. □

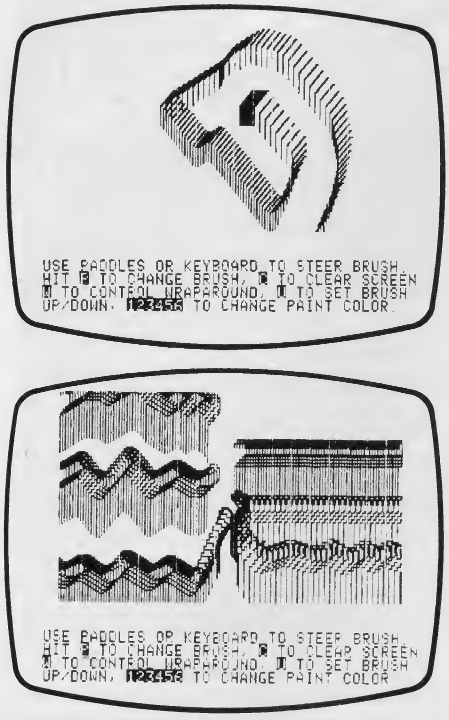
Painter Power

David Lubar

> **creative computing**
> **SOFTWARE PROFILE:**
>
> **Name:** Painter Power
> **Type:** Abstract painting system.
> **System:** 48K Apple, Applesoft, Disk Drive
> **Format:** Disk
> **Language:** Basic and Machine Language
> **Summary:** Fascinating and Fun
> **Price:** $39.95
> **Manufacturer:**
> Micro Lab
> 2310 Skokie Valley Rd.
> Highland Park, IL 60035

Eric Podietz held an audience enthralled with a dynamic creation of abstract art. The demonstration of his real-time graphics system was one of the highlights of the 1980 Personal Computer Arts Festival in Philadelphia. Using angled lines and shapes for brushes, Mr. Podietz put patterns on the screen, creating images reminiscent of weavings, abstract landscapes, and Escher stairways. He used an S-100 system and worked in black and white. But that was last year. During that time, he was not idle. He was busy creating an Apple version, adding extensions that make full use of color graphics and other Apple features. The result is *Painter Power*, a software package unlike anything else on the market. Two versions come with the disk; beginner and advanced. The beginner version gets the user going right away. The advanced version adds more power and a bit more complexity.

To use the beginner version, the painter selects a background color and a speed and gets down to creating. Using keys or paddles, the direction of the moving brush is controlled, putting marvelous images on the screen. If the brush is not to the user's liking, it can be changed easily. During creation, brush color can be changed, the brush can be lifted or set down, or the program can be frozen, allowing changes at the user's leisure. With wraparound set, the brush will reappear opposite the point at which it leaves the screen, and continue painting. With wraparound off, an image of the brush reappears, allowing the user to keep track of its relative location, but will not paint until it is returned to the actual screen. In essence, the painter (player?) has a neat little imagination box that seems to offer an infinite variety of images. Finished scenes can be created and saved to disk, or users can follow in the footsteps of Mr. Podietz and give real-time performances (with an appropriate musical accompaniment). Those who tested the program enjoyed it immensely, even in the beginner version.



```
USE PADDLES OR KEYBOARD TO STEER BRUSH.
HIT B TO CHANGE BRUSH, C TO CLEAR SCREEN
W TO CONTROL WRAPAROUND, U TO SET BRUSH
UP/DOWN. 123456 TO CHANGE PAINT COLOR.
```

```
USE PADDLES OR KEYBOARD TO STEER BRUSH.
HIT B TO CHANGE BRUSH, C TO CLEAR SCREEN
W TO CONTROL WRAPAROUND, U TO SET BRUSH
UP/DOWN, 123456 TO CHANGE PAINT COLOR
```

Simple examples of designs created with Painter Power. The first uses the pre-defined brush from the beginner mode, the second was done with a user-defined brush in the shape of a question mark.

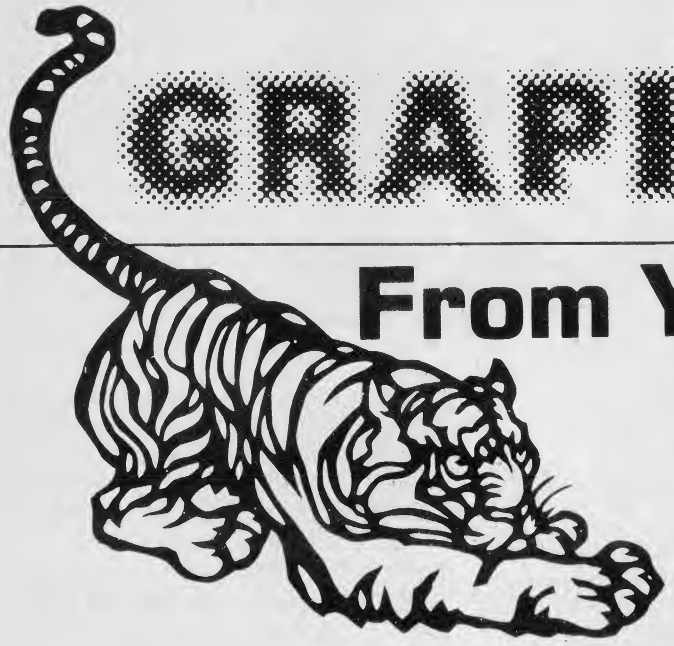
Advanced *Painter Power* adds all the extras that users of the beginner version might begin to wish for. While this version takes a bit more effort on the part of the user, the return is well worth the time spent learning the system. Not only can brushes be created, they can also be saved to disk. There is even the capability to create a special "Quickstroke" where a brush traces a predetermined pattern. And for those with a mathematical bent, a special routine allows the creation of brushes based on math functions. The location of the brush is displayed numerically at the bottom of the screen, aiding the user in keeping track of the brush when wraparound is turned off. There are many more features in the advanced system, and it would take days to explore all of them.

How does *Painter Power* differ from other painting programs? While you can probably reproduce its results with other systems, the fluidity and symmetry obtained by the moving brush make it the easiest system available for abstract designs. The strength of the program is its dedication to a specific area of graphics, and the ease with which it implements that approach.

While *Painter Power* deals with the abstract and is obviously not for everyone, it will delight anyone who is interested in creating patterns and designs, or just finding another way to have fun with the Apple.

Other Graphics

Several other Apple graphics programs arrived here too late to be covered in this issue. Notable among them is a graphics editor from SubLogic, that works in conjunction with their 3-D packages. The A2-GE includes a motion programmer. It will be reviewed here in the near future. Also, several vendors have new packages for shape table creation, animation, and other areas of graphics. These, too, will be explored in detail in upcoming issues. ☐



GRAPHS From Your Apple II

Robert Plamondon

The high resolution graphics capability of the Apple II is a versatile feature, indeed. Graphics are used for such varied purposes as space games, custom character sets, and, or course, graphs.

In the past the use of Apple-generated graphs was limited by the scarcity of programs to generate them, and the means to make permanent copies. Most printers lacked the ability to print graphs, and those that did required machine-language driver programs. Thus, graphic output from the Apple was used only by those who had both a suitable printer and a good deal of programming experience.

Fortunately, those days are now gone. Several popular printers, such as the Paper Tiger, Epson MX-70, and some daisy-wheel printers have graphics capability, either as a standard feature or as an inexpensive option. In addition, several software houses have released programs which allow you to create and print your own graphs.

Scientific Plotter

Scientific Plotter from Interactive Microware and Creative Computing Software is available on diskette for 48K Apples with ROM Applesoft, and comes with about 30 pages of mildly confusing documentation.

This package is designed specifically for lab scientists who want to be able to make neat graphs of experimental data. The only kind of graph it makes is the x-y plot; if you want bar graphs or pie charts, this is not the program for you.

creative computing

SOFTWARE PROFILE

Name: Scientific Plotter
Type: 48K Apple, Applesoft,
Disk drive
Format: Disk
Language: Applesoft
Summary: Quality graphing program
Price: $24.95
Manufacturer:
Interactive Microware, Inc.
P.O. Box 771
State College, PA 16801
or
Creative Computing Software
39 E. Hanover Ave.
Morris Plains, NJ 07950

Scientific Plotter produces a graph of your data points, with each point represented by a circle, square, cross, or star. Each of these symbols is available in four sizes. You can add error bars if you like, and the points can be connected by straight lines, or not, at your option.

The great advantage of the program is that it lets you play with the format of your graph, and scale it exactly to your needs. When drawing graphs by hand, your choices of format and scale are limited by the types of graph paper you have at your disposal. Drawing graphs by hand is also tedious and error-prone—just the kind of thing you'd like to fob off onto a computer.

Scientific Plotter has an impressive array of options. You can type in data points by hand, calculate them in subroutines, or pull them off a disk file. You have full control of the size of the graph, the location of the axes, the scale, and the color of the data points. The format of the graph, the data, and the graph itself can be saved and retrieved from the data. Labels can be placed anywhere on the graph in any of four orientations and in any hi-res color. And there are many other useful features; too many to cover in a review.

Drawing graphs by hand is also tedious and error-prone — just the kind of thing you'd like to fob off onto a computer.

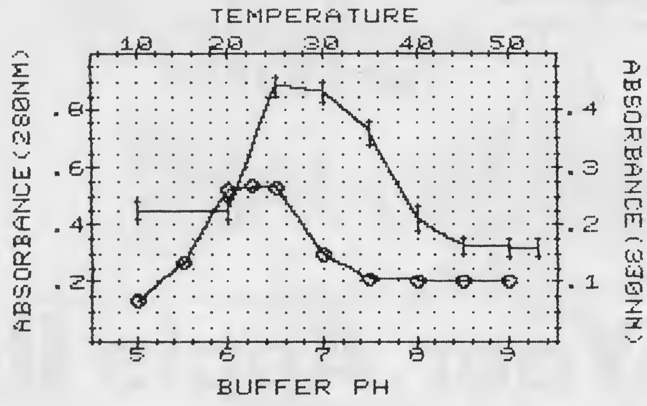
The program works by asking you a series of questions. It starts by printing:

```
NAME OF FORMAT FILE ()?
<NONE>
```

Format files hold all the information on scaling, labels, and whatnot that the program needs to make a graph. The two parentheses generally hold the range of

---

Robert Plamondon, 667 SW 15th Street, Corvallis, OR 97330.



A sample graph mode by Scientific Plotter. Printed in normal plot mode by Paper Tiger Graphics.

values an answer can take; in this case, your response can be anything you want, so there are no limits shown. The "NONE" indicates that if you hit return without typing anything, the program assumes you don't want to load a format file. "NONE" is the default answer.

There are quite a few questions, and answering all of them (if only by the default value) can take a long time, especially when you make mistakes. Fortunately, the default value is equal to the last value you have entered, so you type only the corrections, and hit return on all the other questions. If you read in a format file at the beginning of the cycle, the values in the file become defaults. This can also save time, since most graphs have many parameters in common.

As a final time-saver, Control-A causes the program to step through the questions automatically, assigning the default value to each quantity. This can be stopped by hitting any key. This feature lets you flash past the routine questions and stop only where changes must be made.

As the questions are answered, the program gets the information it needs to start the graph. As soon as you input the position of the x-axis, the program displays the hi-res graphics page, draws the x-axis, and returns to text mode. This sequence of input, plotting, and return to text mode occurs every time the program puts something on the graph, and lets you see what you are building.

The labeling feature is very flexible.

Unfortunately, there is no way to back up to fix a mistake on the previous question. Instead, you must start over. This is the worst flaw in the program.

The labeling feature is very flexible; labels can be placed in any of four orientations, anywhere on the screen. A ridiculously large number of labels can be placed on a graph.

One method of placing labels and axes on the graph is the Cursor command which places a small cross on the hi-res display. This cross can be moved by game paddles or a joystick, and is used to designate the starting position of a label or a coordinate axis without guessing x and y values.

My initial reaction to this program was massive frustration at the difficulty of correcting errors, followed by great satisfaction at the quality of my graphs. Once I had a few format files on disk, I found that I could make graphs with a few non-default values, and everything moved very quickly.

I have found Scientific Plotter to be a very useful program, and a genuine bargain at $25.

Paper Tiger Graphics

Enhanced Paper Tiger Graphics Software from Computer Station provides a way to transfer the contents of the hi-res graphics screen to your printer, assuming that you have a Paper Tiger 440 or 445 with graphics, as I do. Computer Station also sells graphic dump programs for the Paper Tiger 460G, Anadex 9501 and the NEC Spinwriter, which I assume are similar to the one for the Paper Tiger 440G.

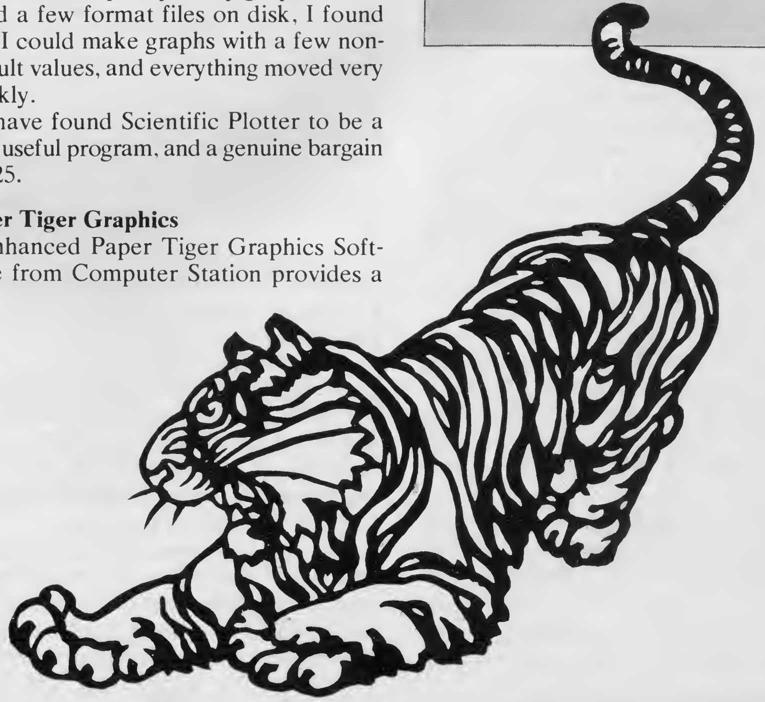
Computer Station takes the problem of putting the contents of the screen onto a piece of paper, solves it elegantly, and wraps a truly foolproof control section around it. The program gives you a printout very quickly; its speed is limited mostly by the speed of the printer interface card. The program is menu-driven, and the menu is the best I have ever seen. The whole program is a joy to use.

The only fly in the ointment is that you have to tell it what kind of interface card you have, and in which slot it is located. If you have trouble remembering the card you have, and where you put it, this can slow you down.

creative computing
SOFTWARE PROFILE

Name: Enhanced Papter Tiger Graphics
Type: Hi-res screen dump
System: 48K Apple, Disk drive, IDS 440G/445G
Format: Disk
Language: Machine language
Summary: Quick and elegant
Price: $54.95
Manufacturer:

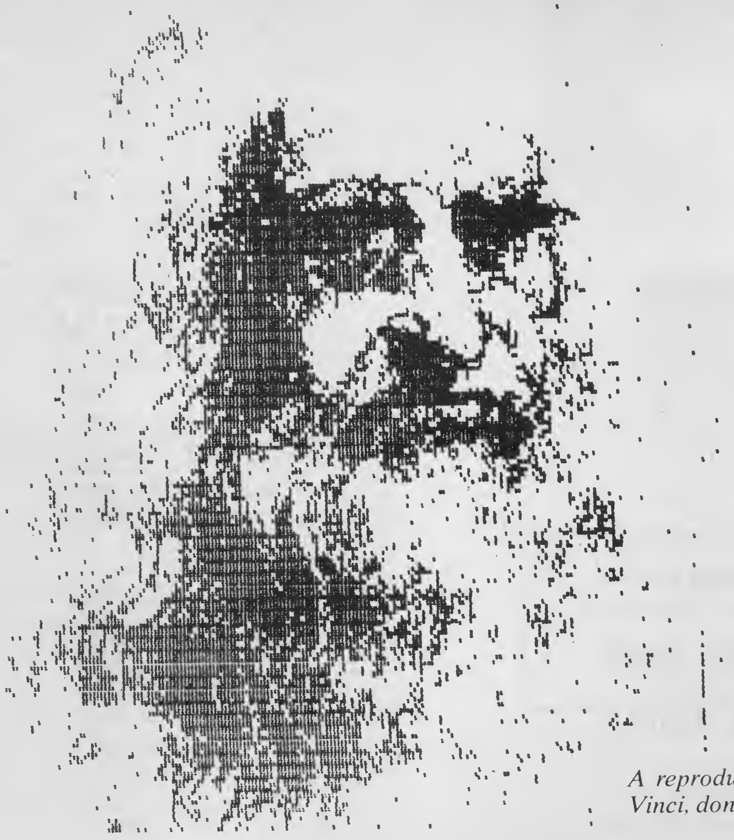
Computer Station
11610 Page Service Rd.
St. Louis, MO 63141



The program lets you print either of the hi-res pages, in either normal (4 3/8" x 2 3/4") or expanded (6 1/2" x 5 3/8") modes. The larger size makes pictures large enough to hang on a wall. You can print either a positive or a negative image (i.e., either a white or a black background); justify the output to the left, center, or right of the page; display the graph before printing it; and load pictures from disk without stopping the program. All in all, the package is very well done.

The software comes with adequate documentation, and a large number of sample graphs and pictures.

Enhanced Paper Tiger Graphics Software runs on the Apple II and Apple II Plus, and costs $54.95. ☐



A reproduction of the famous self-portrait of Leonardo da Vinci, done in expanded plot mode, by Paper Tiger Graphics.

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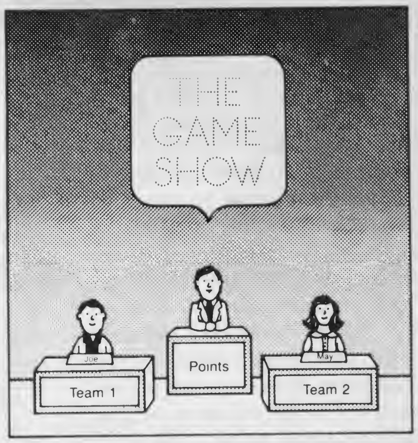

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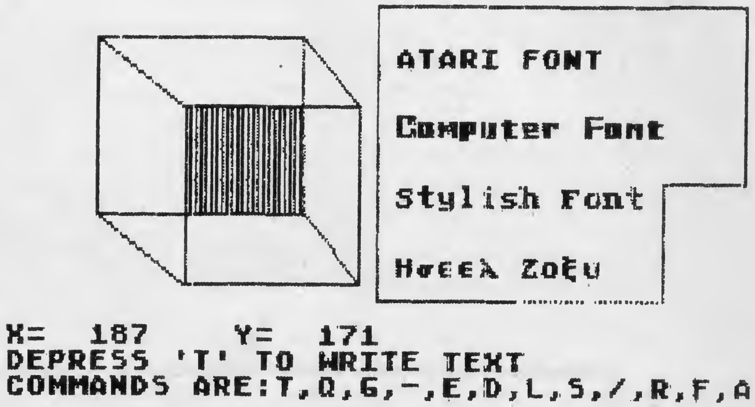
The Atari Graphics Composer

David Lubar



```
X=  187     Y=  171
DEPRESS 'T' TO WRITE TEXT
COMMANDS ARE:T,Q,G,-,E,D,L,S,/,R,F,A
```

Cube was done using the draw-to and fill routines of the hi-res mode. Lettering was added in the text mode.

creative computing

SOFTWARE PROFILE

Name: Atari Graphics Composer

Type: Graphics utility

System: Atari 400 or 800, 32K RAM, Basic Cartridge, paddles or joystick.

Format: Disk or Tape

Language: Basic and Machine Language

Summary: Versatile system for graphic creation

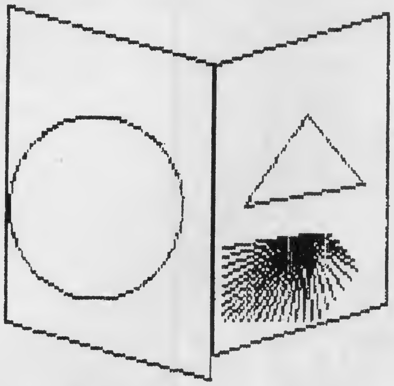
Price: $39.95 on disk or tape

Manufacturer:
Versa Computing, Inc.
3541 Old Conejo Rd. Suite 104
Newbury Park, CA 91320

Everyone who has come within thirty feet of an Atari knows that the machine is capable of great graphics. Everyone who has come closer than that knows how tough it is to get those great graphics. By producing the *Atari Graphics Composer*, Versa Computing has taken care of the hard work, leaving the user free for creativity and experimentation. This set of utilities performs five main functions; hi-res drawing, medium-res drawing, text writing, geometric figure creation, and player creation. The combination is powerful enough to allow a wide range of graphics.

The high-res mode allows drawing with paddles or joystick on a four-color screen with a resolution of 320 by 160. There is one background color, which can be changed at any time, and three foreground colors. While the luminance of the foreground colors can be changed, the color value is predetermined by the background. In this mode, the user can either draw freestyle, or draw lines between any two points. Other options include fill and brush routines. There are two types of brushes; normal brushes fill an area with a solid pattern, the air brush puts a pattern of dots over an area. Combining these, one can color in a picture, then add shading. The fill routine, written in Basic, is not fast, but it is very thorough, filling in most irregular patterns without missing any spots.

Another nice feature is the accelerating crosshair. When the joystick is moved to a new position, the crosshair moves slowly at first, then speeds up. This allows for fine control over a small area and less waiting time when crossing the screen. While the quality of any graphics done in this mode depends, obviously, on the user's artistic ability, the capability is there to produce detailed pictures.



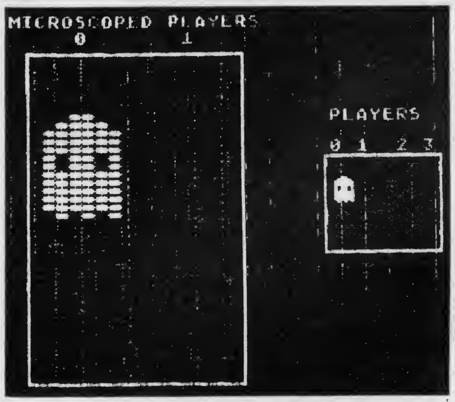
Figures and Moirê pattern made with the geo-maker.

The medium-res mode provides a screen with 160 by 80 resolution, with one background and three foreground colors. These colors can be changed at any time. (For those unfamiliar with the Atari, a change in color actually changes a color register, thus not only do future lines appear in that new color, but lines drawn previously with that color also change to the new color.) As with the hi-res mode, medium-res also provides a fill routine and a selection of brushes.

The text mode places characters from any of four fonts on the hi-res screen. In the disk version of this package, users can switch between any of the modes using hi-res without losing the picture on the screen. Thus a scene can be drawn using the drawing mode, then labeled in the text mode. Along with upper and lower case, all special Atari symbols are supported. Also, the program will accept any user-generated fonts, though the documentation doesn't cover the process of font creation.

To write on the screen, the user first positions the cursor at the desired starting point, using joystick or paddles, then types "T" for text. From that point until the escape key is pressed, all typed characters will be displayed on the screen. Editing keys such as delete still perform their usual function. If the user has switched to lower case, the program won't recognize any commands, but it will prompt the user to press the SHIFT and ALL CAPS keys.

The geo-maker mode allows the creation of a variety of geometric figures, from circles and arcs to triangles and parallelograms. Figures are defined by specifying points. A circle, for example, is defined by its center and any edge point. Triangles and parallelograms require three points. The circle and arc take the longest creation time, while other figures appear rapidly. The geo-maker includes a routine for Moire patterns. The user specifies the step value and, if desired, a window area, then uses the joystick or paddles to fill an area with the pattern.



Player creation is now a simple and dynamic process.

One of the most attractive features of the Atari is the ability to use players in animation. These shapes are usually coded by hand. The *Graphics Composer* has automated the process. Player creation is potentially the most valuable utility on the disk. It presents the user with a grid for designing players. Each large dot turned on in the grid is also displayed in true size on the screen. Once a player is created, it can be saved, and the decimal values representing the player can be displayed, allowing the user to put that player in his own programs.

Beyond explaining all the functions of the programs, the documentation also describes how to use the picture loading routine in other programs, thus making pictures created on this system retrievable by other software.

Anyone doing, or planning to do, graphics work on the Atari should seriously consider the *Atari Graphics Composer.* □

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Atari Music Composer

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ATARI 400

Karl Zinn
and
David Zinn

creative computing
SOFTWARE PROFILE

Name: Atari Music Composer

Type: Music

System: Atari 400 or 800, 8K

Format: Cartridge

Summary: Very well done at a simple price.

Price: $59.95

Manufacturer:
Atari, Inc.
1272 Borregas Ave.
Sunnyvale, CA 94086

We've been using the Atari Music Composer in home education and some school situations. We would like to share our initial experience and preliminary ideas here, and suggest other things that could be done.

The manual for the Music Composer suggests it can be used to develop skills in listening, perception, music notation, composing (melodies, harmony and counterpoint), musical relationships, and building musical structures from simple parts. We found we could do all these things and more, always in a pleasant and rewarding educational environment. Nearly all of our trials were in a home setting; but some were in a summer class for 8 to 14 year-olds interested in using computers.

For those who know other music boards for small computers (ALF, MicroMusic, MicroTech, Symtek), this one is comparable with five important differences.

1) Nothing extra is needed. The circuitry is built into the Atari and the audio is amplified by the TV set (or monitor) which is used as the display device for the computer. You can also take the audio out of a 5-pin jack on the side of the Atari 800 to feed any other amplifier.

2) Most people will use it as given. Since the Composer software is in ROM it can't be changed. Programs can be written in Basic either to generate data files that can be read by the Composer, or to play the Composer's data files with other tonal characteristics.

3) Use is very straightforward, with most of the options so obvious that a manual is not needed. The user works through menu pages linked in a hierarchical structure, with clear mnemonics and using normal keys for insert, delete and cursor control.

4) The system protects rather well against common user errors. New users, without previous experience with computers, get melodies to play back about as they intended them, and are not likely to lose them accidentally.

5) The user has little or no control over tone quality, attack and decay, crescendo, and the like.

The basic building block is a musical phrase; up to ten can be stored in memory. Phrases are arranged in up to four voices, with dynamics, repetition and transposition specified in a list of statements which looks like a computer program. Indeed, the composition activity can be used to develop programming concepts such as sequencing and iteration. Building a melody and counterpoint from phrases is good practice in music education as well.

Phrases, voices or an entire composition can be saved on tape or disk, and retrieved later, perhaps with new arrangements. We much prefer disk because it is faster, but the cassette was adequate when we put only one data file on the beginning of a tape. (You will have discovered this problem with positioning the tape when reading a file from the middle of a tape if you use cassette on the Atari. We have heard that this software problem in cassette control will be fixed by Atari in a future release of the operating system.)

We already said we hardly needed the manual. This should be true for almost any experienced computer user, and perhaps many novices. We find a five-minute demo to be enough to get anyone started; a few things may not be obvious, such as "FN" as the abbreviation for "File Name" in a prompt, and the prefix "D:" needed to specify that the file is to be retrieved from (or saved on) disk instead of cassette. But the manual is well-organized with clear descriptions and photos of the screen in various states. We recommend it to those who would rather learn systematically than by exploration. One part provides an overall description with things to do; another provides the file structure for those who wish to do things with Basic as well; it includes programs for listing files, composing music, and arranging harmony. A last part summarizes each of the commands.

We have many stories to tell about our use of the Music Composer, and plan to

---

Karl Zinn, University of Michigan, Center for Research on Learning & Teaching, Ann Arbor, MI 48104.

David Zinn, Greenhills School, Ann Arbor, MI.

do so in a later article after we have experience with a greater variety of users and in other educational settings. Perhaps you can get an idea from these brief notes: Piano music entered into the Atari was played and displayed by the computer in a regular way which made obvious some syncopation which had been hard for the student to catch and perform otherwise. Some band music was entered so that the cornet player could practice (at home) with the other parts played by the Atari. A band part in the Atari was used as a model (and a metronome) for repeated practice of a difficult sequence, gradually coming up to the required speed. Music heard only on the air was entered and reviewed (and played for fun), exercising notation, interval recognition, note duration, time signature, key signature and other music components. The pleasure of this activity for kids contrasts with the reluctant response of some students to "dictation" exercises.

Music already stored in the Atari was modified in various ways (e.g., tempo and counterpoint) to change the style. Musical rounds and fugues were explored, pushing the complexity until the sounds were no longer pleasing to the arranger or composer. Timbre (tone quality) was explored by writing parts in unison and then transposing them to various partials (harmonics) one octave away, an octave and a fifth, two octaves, etc. Original compositions were developed by entering familiar melodies in up to ten phrases and rearranging them in interesting ways (such as those compositions of P.D.Q. Bach as discovered by Professor Peter Schickele!)

What we missed most while using the Atari Music Composer is a display of all four voices at once (as on a regular musical score or piano music). Sometimes it is difficult to find the part you wish to modify, since you can look at only one phrase at a time, and one measure in that phrase. Getting everything on the screen at once is a lot to ask of an 8K ROM application cartridge operating with an 8K RAM (yes, all these cartridges work on the 8K Atari 400 as well as our 48K 800) and displayed on an ordinary TV. If it weren't for the lack of resolution in TV rasters Atari might have avoided the problem of where to put the note stems by displaying each voice on a separate staff. Having a printout of the score would be really nice, and get around the TV display limitations.

At times we could enter music as chords instead of notes in separate voices. A good composer aid offer many options for entry of music. But being limited to one, entry in phrases and voices is the right one for this beginner's composer. Other advanced aids are also missing: tone quality, envelope (attack and decay), inversion, and other operations on musical patterns. We suspect that some of these can be done from Basic.

Although it is nice to be able to get all of the disk operating system from the Music Composer, working through it all to get a listing of what files are on the disk is a nuisance. One should be able to display the music files on the screen directly, and select one without the computer first erasing all the names. (It takes "D, <RETURN>, A, <RETURN> ,RETURN" to get the directory on the screen. To get back requires a <RETURN> which erases the screen and then a "B, <RETURN>" to get back into the Music Composer. The new DOS 2.OS for the Atari simplifies this slightly (fewer returns are required) but one is still limited to what was designed into the Composer ROM.

In summary, although we could ask for more, what is provided was done very well for home education and recreational activities at a simple level. Clearly some people thought carefully about what should go into the Music Composer to make it helpful in music education. We hope others who find themselves in the position of advising computer companies will also help make the entertainment products better for education.

The Music Composer is available for $59.95 from Atari Inc., 1272 Borregas Ave., Sunnyvale, CA 94086. □

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Deep in the Heart of Texas

Owen Linderholm

creative computing
SOFTWARE PROFILE

Name: Music Maker Module
Type: Music
System: TI 99/4
Format: Module
Language: Machine
Summary: Difficult to use, but worth the price.
Price: $39.95
Manufacturer:
Texas Instruments, Inc.
P.O. Box 53
Lubbock, TX 79408

From deep in the heart of Texas comes the Music Module, a plug-in module for the TI 99/4 which gives it limited music synthesis capability. No fancy sixteen voice, waveform controlled or stereo output machine, the module provides only three music voices, some volume control and a little bit of noise generation.

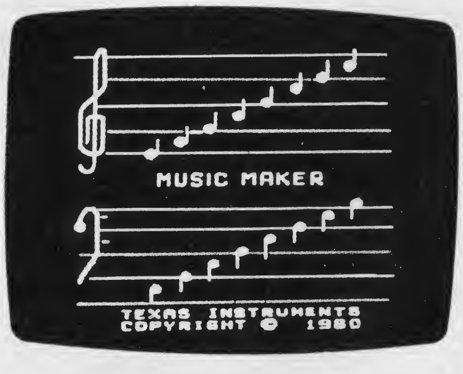
Sound-Graphs

Two modes are available: "sound-graphs" and "traditional," the first is used mainly as a strange noise maker. When you enter this mode you are asked which noise generator you want, what speed at which to play the music and whether you want to change any of the frequencies for the scales. There are eight noise generators available, four of which provide "periodic" noise and four of which provide "white" noise. One generator from each of these two groups plays noise based on the frequency of the third musical voice. When I was experimenting with these generators, I found that they added very little to the sound produced. Of the speeds available, only those between about 15 and 30 were of much use, as those lower than 15 were far too slow to play the music in a recognizable manner.

The ability to change frequencies is of some use, but since the sound-graph mode cannot produce much of musical value this feature is not very useful.

When these values have been set, the computer proceeds to the music input mode. The user is shown two rectangular areas in which he can draw lines which represent various frequencies, volumes and noises. Inputting a measure can be done with the keyboard or the Wired Remote Controllers. I found the keyboard very awkward to use and could only input exactly what I wanted with difficulty.

Editing of the music already entered can be easy or difficult depending on how much needs to be changed and on where and when the mistake is discovered. One very useful editing facility is the ability to copy all or part of a measure already entered. Playback of the music is relatively simple and pleasant effects are obtainable with a little effort. The longest composition can only be 46 measures, which is generally long enough for most purposes but can be annoying if a longer piece is desired.


MUSIC MAKER
TEXAS INSTRUMENTS
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Traditional Mode

The other mode available is the traditional mode by which music can be entered in standard musical notation. The method of input is similar to the method for sound-graphs. When you enter the traditional mode, you are asked to enter the number of sharps or flats to define the key signature, then the time signature and the speed. All these are necessary and work as they should, except for the speed which is exactly the same here as for the sound-graphs.

The method of entering music is also the same except that when you wish to change between different types of note, such as between crotchets or quavers, the cursor must be moved from the staff off to the side, where the notes can be changed. This involves a great deal of key pushing and frustration, and makes the entry of most pieces of music a very laborious task.

The staff and the rest of the screen display is very well laid out and the music is easy to read with the three different voices shown in three separate colors. Another feature is that each note can have independent volume control on a scale of one to eight. This allows crescendos and decrescendos and so on, but is also a bit difficult to use.

Editing and playback are similar to the sound-graph mode and are reasonably straightforward. Music can be easily stored on cassette or disk and retrieved. It is also possible to print out music if the TI thermal printer is connected. These are very useful functions and not available on many more expensive and complicated computer music synthesizers. The other major disadvantage of the module is its three-octave range.

Now comes the great advantage of the Music Maker Module: the extremely low price of $40. At that price, the Music Module is a worthwhile investment for the average user who is not thinking of recording contracts or playing at major concert halls. It is also possible that using the remote controllers makes the entry of music a lot simpler. ☐

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*Tilt

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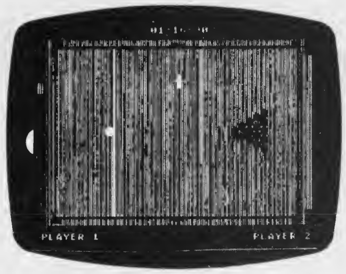

*Pool

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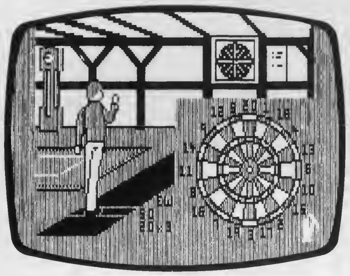

*Darts

Enter the pub, grab a pint of lager and a handful of darts, then try for a bull's eye in this amazing graphic game. One or two players can go at it, testing their aim at ten skill levels. Whether you want to throw a few, or just show your friends what the Atari computer can do, **Darts** is an ideal addition to your software library. This is Britain's most popular Atari game from Thorn/EMI. Order cassette CS-7011 $14.95.

*Billiards

This captivating British game is played with three balls on a standard pool table. Each player attempts to score by sinking a shot or hitting two balls with his cueball. From Thorn/EMI. Order cassette CS-7012 $14.95.

*Snooker

A tough British Game using 26 balls requiring the eye of sharpshooter and the strategy of a chess master. From Thorn/EMI. Not available on cassette.

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Trucker

This program simulates coast-to-coast trips by an independent trucker hauling various cargos.

If all goes well, you can obey the speed limits, stop for eight hours of sleep each night and still meet the schedule. Bad weather, road construction or flat tires may put you behind schedule. You may try to increase your profit by skimping on sleep, driving fast or carrying an overweight load. Not available on cassette.

Streets of the City

During your tenure, you must construct streets and Interstate highways, repair existing streets, and improve traffic safety. For the Transit Authority you have to upgrade and replace a delapidated bus fleet, increase ridership, reduce maintenance downtime and improve on-schedule performance. Not available on cassette.

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Only the brave enter the Colossal Cave, and only the clever survive. The entire evil cast of this classic game, from deadly dragon to nasty dwarf, will try to stop your quest for treasures. Using English commands, you explore the cave, travel through more than 100 locations, gather treasures, and attempt to think your way out of dangerous situations. Every aspect of the game is faithfully reproduced from the Original Adventure born on large computer systems. For weary travelers, there is even a SAVE GAME feature. Add this classic to your software collection. Order CS-7504 for disk $24.95, CS-7009 for cassette $19.95.

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Computer Services Corp.
71 Murray St.
New York, NY 10005
(212)619-4000; (800) 221-2486
Business, word processing

Computer Station
11610 Page Service Dr.
St. Louis, MO 63141
(314) 432-7019
Utilities

Computer's Voice
2370 Ella Dr., Dept. 122
Flint, MI 48504
(313) 238-5585
Recreational, DBMS, educational

Computer Systems International
15 Grand Ave.
Englewood, NJ 07631
(201) 894-0653
Business

Computerware
Box 668
1512 Encinitas Blvd.
Encinitas, CA 92024
(714) 436-3512
Recreational, utilities

Computronics
50 N. Pascack Rd.
Spring Valley, NY 10977
(914) 425-1535; (800) 431-2818
Recreational, business, educational, utilities, word processing

Comshare Target Software
Suite 200, 1935 Cliff Valley Way
Atlanta, GA 30329
(404) 634-9535
Business

Comtronic Systems
P.O. Box 3325
Kent, WA 98031
Recreational

Conceptual Instruments Co.
4730 Warrington Ave.
Philadelphia, PA 19143
Utilities

Conduit
P.O. Box 388
Iowa City, IA 52240
(319) 353-5789
Educational

Context Management Systems
23864 Hawthorne Blvd. #101
Torrance, CA 90505
(213) 378-8277
Business

Context Systems
632 Via Del Monte
Palos Verdes, CA 90274
(213) 375-3350
Business

Continental Adventures
4975 Brookdale St.
Bloomfield Hills, MI 48013
(313) 645-2140
Recreational

Continental Software
16724 Hawthorne Blvd.
Lawndale, CA 90260
(213) 371-5612
Personal finance

Contract Services Associates
706 S. Euclid
Anaheim, CA 92802
(714) 635-4055
Personal finance

Control Data Corporation
8100 34th Ave. South
P.O. Box O
Minneapolis, MN 55440
(612) 853-4541
Educational

Cook's Computer Company
1905 Bailey Dr.
Marshalltown, IA 50158
Educational

Co-Op Software
P.O. Box 432
West Chicago, IL 60185
Utilities

The Cornsoft Group
6008 N. Keystone Ave.
Indianapolis, IN 46220
(317) 257-3227
Recreational

Cornucopia Software
P.O. Box 5028
Walnut Creek, CA 94596
(415) 524-8098
Word processing

Directory, continued...

Cortechs Corporation
900 N. Franklin
Chicago, IL 60610
(800) 621-4109; in IL (312) 943-0700
Utilities

Cosmopolitan Electronics Corporation
P.O. Box 234
Plymouth, MI 48170
(313) 397-3126
Systems

Cottage Software
614 N. Harding
Wichita, KS 67208
Utilities

Countryside Data
718 North Skyline
Suite 201(B)
Idaho Falls, ID 83401
Business

CPAids
1640 Franklin Ave.
Kent, OH 44240
(216) 678-9015

Crane Software Inc.
16835 Algonquin, Suite 611
Huntington Beach, CA 92649
(714) 846-8005
Utilities

Creative Computing
39 E. Hanover Ave.
Morris Plains, NJ 07950
(800) 631-8112; in NJ (201) 540-0445
Recreational, educational, utilities

Creative Software
201 San Antonio Circle #270
Mountain View, CA 94040
(415) 948-9595
Recreational, educational, home

Creative Software Concepts
P.O. Box 349
Bingham, NY 13902
Business

Creative Thamaturgy
P.O. Box 107 Forest Park Branch
Dayton, OH 45405
Educational

Crown Micro Products
P.O. Box 892
Marysville, WA 98270
(206) 659-4279
Systems

Crow Ridge Associates, Inc.
P.O. Box 90
New Scotland, NY 12127
(518) 482-2990
Utilities

Crystal Computer
17120 Monterey Rd.
Morgan Hill, CA 95037
(408) 778-2966
Recreational

Curriculum Applications
P.O. Box 264
Arlington, MA 01174
Educational

Custom Business Computer Systems
1293 Lavall Dr.
Cambrills, MD 21054
Business

Custom Data
P.O. Box 1066
Alamogordo, NM 88310
(503) 434-1096
Business

Cybernetics, Inc.
8041 Newman Ave., Suite 208
Huntington Beach, CA 92647
(714) 848-1922
Systems

Cybertronics International
999 Mt. Kemble Ave.
Morristown, NJ 07960
(201) 766-7681; (212) 532-3089
Recreational, educational

Dakin5 Corporation
P.O. Box 21187
Denver, CO 80221
(303) 426-6090
Recreational, business

Dr. Daley's Software
Water St.
Darby, MT 59829
(406) 821-3924
Educational

Dantek Software, Inc.
4550 Schoolhouse Rd.
Batavia, OH 45103
(513) 752-1921
Systems

Data Access Management Service
3320 Rivers Ave.
Charleston, SC 29405
(803) 554-7005
Utilities, word processing

Datagraph
728 Highway 4, #2
P.O. Box D
Arnold, CA 95223
(209) 795-5104
Business

Datamost
9748 Cozycroft Ave.
Chatsworth, CA 91311
(213) 366-7160
Recreational, personal finance

Data Resource Corp.
1040 Lunaai St.
Kailua, HI 96734
(808) 261-2012
Utilities

Data-Rx, Inc.
686 Lighthouse Ave.
Monterey, CA 93940
(408) 375-2775
Systems

Data Soft
16606 Schoenborn St.
Sepulveda, CA 91343
(213) 701-5161
Word processing, systems

Data Technology Industries
700 Whitney St.
San Leandro, CA 94577
(415) 638-1206

Data Transforms, Inc.
906 E. Fifth Ave.
Denver, CO 80218
(303) 722-8774
Utilities

Decision Resources
44 White Birch Rd.
Weston, CT 06883
(203) 222-1974
Utilities

Decision Support Software
1438 Ironwood Dr.
McLean, VA 22101
(703) 243-1216
Business

Demi-Software
6 Lee Rd.
Medfield, MA 02052
Word processing

The Denver Software Co.
14100 E. Jewell Ave., Suite 15
Aurora, CO 80012
(303) 750-9980
Business

Designer Software
3400 Montrose Blvd., Suite 718
Houston, TX 77006
(713) 520-8221
Word processing, business

Developmental Learning Materials
One DLM Park
Allen, TX 75002
(214) 248-6300
Educational

Digiac Corp.
175 Engineers Rd.
Smithtown, NY 11787
(516) 273-8600
Educational, word processing

Digital Marketing
2670 Cherry Lane
Walnut Creek, CA 94596
(415) 938-2880
Utilities

Digital Research
P.O. Box 579
Pacific Grove, CA 93950
(408) 646-3896
Systems

D.J. AI Systems Ltd.
Two Century Plaza, Suite 480
2049 Century Park East
Los Angeles, CA 90067
(213) 203-0851
Utilities

DJR Associates
2 Highland Lane
N. Tarrytown, NY 10591
(914) 631-6766
DBMS

D & M Software
1510 South 96th St.
Tacoma, WA 98444
(206) 537-8155
Utilities, word processing

Documan Software
Box 387-A
Kalamazoo, MI 49005
(616) 344-0805
Utilities, personal finance

Dow Jones Information Services
P.O. Box 300
Princeton, NJ 08540
(609) 452-2000
Personal finance

Dresen Associates
P.O. Box 246
Dresen, ME 04342
(207) 737-4466
Educational

Duosoft Corporation
Box 1827
Champaign, IL 61820
(217) 356-3111
Business

Dynacomp
1427 Monroe Ave.
Rochester, NY 14618
(716) 442-8960; (800) 828-6772
Recreational, educational, business, utilities

Eagle Software Publishing
110 W. Lancaster Ave.
Wayne, PA 19087
(215) 964-8660
Business

Echelon
6513 Lankershim Blvd., #2212
N. Hollywood, CA 91606
(213) 763-7997
Recreational

Ecosoft
P.O. Box 68602
Indianapolis, IN 46268
(317) 283-8883
Business

Ed-Sci Development
460 Beacon St.
San Francisco, CA 94131
(415) 282-7020
DBMS

Education Programs
Disney Electronics
6153 Fairmont Ave.
San Diego, CA 92120
(714) 281-0285
Educational

Educational Activities
1937 Grand Ave.
P.O. Box 87
Baldwin, NY 11510
(516) 223-4666
Educational

Educational Computing Systems
106 Fairbanks Rd.
Oak Ridge, TN 37830
(615) 483-4915
Educational, utilities

Educational Courseware
3 Nappa Lane
Lees Port, CT 06880
(203) 227-1438
Educational

Educational Micro Systems
P.O. Box 471
Chester, NJ 07930
Educational

Educational Services Management Corp.
P.O. Box 12599
Research Triangle Park, NC 27709
(919) 781-1500
Educational

Educational Software Midwest
414 Rosemere Lane
Maquoketa, IA 52060
(319) 652-2334
Educational

Educational Software Professionals, Ltd.
38437 Grand River
Farmington Hills, MI 48018
(313) 477-4470
Educational

Edu-Soft Steketee Educational Software
4639 Spruce St.
Philadelphia, PA 19139
(215) 747-1284
Educational

Edutek Corp.
P.O. Box 11354
Palo Alto, CA 94036
(415) 325-9965
Educational

Edu-Ware Services, Inc.
P.O. Box 22222
Agoura, CA 91301
(213) 346-6783
Recreational, educational

Eigen Systems
P.O. Box 10234
Austin, TX 78766
(512) 837-4665
Utilities

El Comp Publishing
53 Redrock Lane
Pomona, CA 91766
(714)623-8314
Recreational, business, utilities, word processing

Electronic Courseware Systems, Inc.
P.O. Box 2374, Station A
Champaign, IL 61820
(217) 359-7099
Educational

Elliam Associates
24000 Bessemer St.
Woodland Hills, CA 91367
Utilities

Ellis Computing
600 41st Ave.
San Francisco, CA 94121
(415) 751-1522
Systems

Eltech Associates
2466 Moreno Dr.
Los Angeles, CA 90039
(213) 663-0347
Business

En-Joy Computer Products
P.O. Box 1535
Goleta, CA 93116
Recreational, utilities, home

Entelek
Ward-Whidden House
The Hill
P.O. Box 1303
Portsmouth, NH 03801
(603) 436-0439
Educational

Etronix
14803 N.E. 40th St.
Redmond, WA 98052
(206) 881-0857
Educational

Eventide Clockworks, Inc.
265 West 54th St.
New York, NY 10019
(212) 581-9290
Utilities

Evolution Software, Inc.
1632 Bathurst St.
Toronto, Ontario
Canada M5P 3I5
(416) 787-3441
Word processing, utilities

Exidy Systems, Inc.
1234 Elko Dr.
Sunnyvale, CA 94086
(408) 734-9831

Expecon
616 43rd Ct.
Rapid City, SD 57701
(605) 342-8455
Business

EZ Software
P.O. Box 591
Novato, CA 94947
Personal finance

Fantastic Software
P.O. Box 27734
Las Vegas, NV 89127
(702) 362-1457
Recreational

Ferox Microsystems, Inc.
1701 N. Ft. Myer Dr.
Suite 611
Arlington, VA 22209
(800) 336-5496; (703) 841-0800
Utilities

William A. Fink
P.O. Box 5912
Lighthouse Point, FL 33074
(305) 942-5706
Recreational

FPS Associates
P.O. Box 1320, Station A
Vancouver, B.C., Canada V6C 2T2
(604) 986-0558
Business

GB Associates
P.O. Box 3322
Granada Hills, CA 91344
Word processing

Gebelli Software, Inc.
1791 Tribute Rd. #E1
Sacramento, CA 95815
(916) 925-1432
Recreational

Allen Gelder & Co.
Box 11721 Main Post Office
San Francisco, CA 94101
Systems

Gnosis
4005 Chestnut St.
Philadelphia, PA 19104
(800) 523-0725; in PA (215) 387-1500

Good-Lyddon Data Systems
5486 Riverside Dr.
Chino, CA 91710
Systems

Gooth Software
931 S. Bemiston
St. Louis, MO 63105
Personal finance

Gryphon Microproducts
P.O. Box 6543
Silver Spring, MD 20906
Utilities

Roger Hagan Associates
1019 Belmont Pl. E
Seattle, WA 98102
(206) 324-5034
Word processing

J.L. Hammett Company, Inc.
Hammett Pl.
P.O. Box 545
Braintree, MA 02184
(617) 848-1000
Educational

Dan G. Haney & Associates, Inc.
P.O. Box 687
San Mateo, CA 94401
(415) 493-4094
Utilities

Hartley Software
P.O. Box 431
Dimondale, MI 48821
(616) 942-8987
Educational

Hayden
50 Essex St.
Rochelle Park, NJ 07662
(201) 843-0550; (800) 631-0856
Recreational, educational, business, utilities, systems

Heath Company
Benton Harbor, MI 49022

Hexagon Systems
P.O. Box 397 Station A
Vancouver, B.C.
Canada V6C 2N2
(604) 682-7646
Word processing

H & H Trading Co.
P.O. Box 549
Clayton, CA 94517
(415) 672-3233
Personal finance

Highlands Computer
14422 S.E. 132nd
Renton, WA 98055
(206) 228-6691
Recreational, utilities

High Technology Software Products Inc.
P.O. Box 14665
8001 N. Classen Blvd.
Oklahoma City, OK 73113
(405) 840-9900
Educational, business, utilities

Hikari Group
3032 Fourth Ave. W.
Seattle, WA 98119
(206) 382-6632
Utilities

Holman D-P Service
2059 W. Lincoln
Oroville, CA 95965
(916) 533-5992
Business

Holt-Rhinehart, Winston
383 Madison Ave.
New York, NY 10017
(212) 872-2206
Educational

Horizon Simulations
7561 Crater Lake Hwy.
White City, OR 97503
(503) 826-4640
Recreational

Houghton Mifflin Co.
One Beacon St.
Boston, MA 02107
(617) 725-5000
Educational

Howard Software Services
8008 Girard Ave., Suite 310
La Jolla, CA 92037
(714) 454-0121
Personal finance

Howe Software
14 Lexington Rd.
New City, NY 10956
Utilities, systems, home

Human Engineered Software
3748 Inglewood Blvd., Rm. 11
Los Angeles, CA 90060
Utilities

Human Systems Dynamics
9249 Reseda Blvd., Suite 107
Northridge, CA 91324
Utilities

I. D. S. I.
P.O. Box 1658
Las Cruces, NM 88004
(505) 522-7373
Recreational

I. J. G. Computer Services
1260 W. Foothill Blvd.
Upland, CA 91786
(714) 946-5805
Word processing

Image Computer Products
615 Academy Dr.
Northbrook, IL 60062
(312) 564-5060
Utilities

Imagineering Inc.
c/o Adcast Advertising
405 S. Farwell, Suite 10
Eau Claire, WI 54701
(715) 835-8611
Word Processing

Imaginuity Inc.
13423 Desert Hills NE
Albuquerque, NM 87111
(505) 294-4966
Utilities

IMB
P.O. Box 289
Williamstown, MA 01267
(413) 663-9648
Recreational

Infocom, Inc.
6 Faneuil Hall Marketplace
Boston, MA 02109
Recreational

InfoSoft Systems Inc.
25 Sylvan Rd. S.
Westport, CT 06880
(203) 226-8937
Systems

Information Unlimited Software
281 Arlington Ave.
Berkeley, CA 94707
(415) 525-9452
Educational, word processing

Inner Access Corp.
517-K Marine View
Belmont, CA 94002
(415) 591-8295
Systems

InnoSys, Inc.
2150 Shattuck Ave.
Berkeley, CA 94704
(415) 843-8122
Personal finance

Innovative Software Applications
Box 2797
Menlo Park, CA 94025
(415) 326-0805
Word processing

Insoft
10175 Barbar Blvd., Suite 202B
Portland, OR 97219
(503) 244-4181
Recreational, business, systems

Instant Software
Peterborough, NH 03458
(603) 924-7296
Recreational, educational, utilities

Instructional Development Systems
29 Virginia Beach Blvd.
Virginia Beach, VA 23452
(804) 340-1977
Educational

Integron Systems
300 W. 109 St.
New York, NY 10025
(212) 866-6722
Business, word processing

Intelligent Investor
810 Camelview Plaza
6900 E. Camelback Rd.
Scottsdale, AZ 85251
(602) 941-5315
Personal finance

Intelligent Systems Corp.
Intecolor Dr.
225 Technology Park/Atlanta
Norcross, GA 30092
(404) 449-5961
Word processing, business

Interactive Micro Systems
P.O. Box 21007
Columbus, OH 43221
(614) 363-1534
Utilities

Interactive Microware
P.O. Box 771
State College, PA 16801
(814) 238-8294
Systems, recreational

International Institute of Applied
Technology, Inc.
20010 Century Blvd.
Germantown, MD 20767
(301) 428-9010
Educational, systems

International Software Marketing, Ltd.
120 E. Washington St.
Syracuse, NY 13202
(315) 474-3400
Educational, business, utilities, systems

Interpretive Education
2306 Winters Dr.
Kalamazoo, MI 49002
(616) 345-8681
Educational

Intersoft Unlimited
Box 383 Station C
Kitchener-Waterloo, Ontario
Canada N2G 3Y9
Systems

Investors Software
48 Iron Ship Plaza
San Francisco, CA 94111
(414) 981-5261
Personal finance

IOTC, Inc.
910 Sully
Laramie, WY 82070
(307) 721-5818
Word processing

Island Graphics
P.O. Box V
Bethel Island, CA 94511
(415) 684-2664
Utilities

Ithaca Intersystems
1650 Hanshaw Rd.
Ithaca, NY 14850
(607) 257-0190
Systems

JF Consulting
74-355 Buttonwood
Palm Desert, CA 92260
(714) 340-5471
Utilities

Jini Micro Systems
Box 274 Kingsbridge Station
Riverdale, NY 10463
(212) 796-6200
DBMS

J&KH Software
2820 S. Abingdon St.
Arlington, VA 22206
(703) 820-4131
Utilities

Johnson Associates
P.O. Box 1402
Redding, CA 96001
(916) 221-0740
Utilities

JRT Systems Inc.
P.O. Box 22365
1891 23rd Ave.
San Francisco, CA 94122
(415) 566-4240
Systems

J & S Software
140 Reid Ave.
Port Washington, NY 11050
(516) 944-9304
Educational

Kate's Komputers
P.O. Box 1675
Sausalito, CA 94965
(415) 332-9434
Personal finance

K-Byte
1705 Austin
Troy, MI 48099
(313) 524-9878
Recreational

Kensington Microware Ltd.
300 E. 54th St., Suite 3L
New York, NY 10022
(212) 490-7691
Word processing

Kleinhammer Business Software
P.O. Box 1065
Morro Bay, CA 93422
Business

Krell Software
21 Millbrook Dr.
Stonybrook, NY 11790
(516) 751-5139
Recreational, educational

KSoft
318 Lakeside Dr.
Brandon, MS 39042
(601) 992-2239
Utilities

Kwik Software
P.O. Box 328
Bolivar, MO 65613
Systems

Lazer Micro Systems, Inc.
P.O. Box 55518
Riverside, CA 92717
(714) 735-1041
Systems

Learning Tools Inc.
4 Washburn Pl.
Brookline, MA 02146
(617) 566-7585
Educational

Legend Industries, Ltd.
2220 Scott Lake Rd.
Pontiac, MI 48054
(313) 674-0953
Systems

Level IV Products Inc.
32461 School Craft
Livonia, MI 48150
(313) 525-6200
Educational

The Liberty Software Co.
635 Independence Ave., SE
Washington, DC 20003
(202) 544-6674
Educational

Libra Laboratories, Inc.
495 Main St.
Metuchen, NJ 08840
(201) 494-2224
Business

Lifeboat Associates
1651 3rd Ave.
New York, NY 10028
(212) 860-0300
Business, systems, utilities

Lightning Software
P.O. Box 11725
Palo Alto, CA 94306
(415) 856-1855
Educational

Lindbergh Systems
41 Fairhill Rd.
Holden, MA 01520
(617) 852-0233
Utilities

Link Systems
1655 26th St.
Santa Monica, CA 90404
(213) 453-1851
Utilities

Little Genius
34-38 83rd St.
Jackson Heights, NY
Educational

LJK Enterprises
P.O. Box 100827
St. Louis, MO 63129
Utilities

Lizcon Trading
2949 S. 300 West
Salt Lake City, UT 84115
(801) 484-8179
Business

Logo Computer Systems
989 Avenue of the Americas
New York, NY 10018
(212) 564-6020
Educational

L & S Computerware
1589 Fraser Dr.
Sunnyvale, CA 94087
(408) 738-3416
Educational

Lynn Computer Service
6831 W. 157th St.
Tinley Park, IL 60477
(312) 429-1915

McGraw-Hill
1221 Avenue of the Americas
New York, NY 10020
(212) 997-6194
Educational

Macrotronics, Inc.
1125 N. Golden State Blvd.
Suite G
Turlock, CA 95380
(209) 667-2888
Recreational, educational

Manhattan Software
P.O. Box 1063
Woodland Hills, CA 91365
(213) 704-8494
Word processing, home, recreational

M.A.C. Software
P.O. Box 27
Chillicothe, OH 45601
Recreational

Charles Mann & Associates
55722 Santa Fe Trail
Yucca Valley, CA 92284
(714) 365-9718
Educational, business, utilities, DBMS

Mark Data Products
23802 Barquilla
Mission Viejo, CA 92961
(714) 768-1551
Recreational

Mark of the Unicorn
P.O. Box 423
Arlington, MA 02174
(617) 489-1387
Word processing

Marshall Associates
Dept. 106
P.O. Box 12042
Huntsville, AL 35803
Utilities

Martin Consulting
94 Macalester Bay
Winnipeg, MB
Canada R3T 2X5
Utilities

Masterworks Software Inc.
1823 W. Lomita Blvd.
Lomita, CA 90717
(213) 539-7486
Utilities, home

Math Software
1233 Blackthorn Pl.
Deerfield, IL 60015
Educational

Mathware/Math City
4040 Palos Verdes Dr. N.
Rolling Hills Estates, CA 90274
(213) 541-3377
Educational

Medfield Computer Software
39 Green St.
Medfield, MA 02052
(617) 359-2364
Business

Med Systems Software
P.O. Box 2674
Chapel Hill, NC 27514
(919) 933-1990
Recreational, educational

Megasoft Inc.
31 East 31st St.
New York, NY 10016
(212) 889-4356
Recreational

Mentor Software
Box 791
Anoka, MN 55303
Educational

Mercer Systems Inc.
87 Scooter Lane
Hicksville, NY 11801
Educational

Merry Bee Communications
815 Crest Dr.
Omaha, NE 68046
(402) 592-3479
Recreational, educational

Meta Software Engineering
4737 Trumbull SE
Albuquerque, NM 87108
(505) 268-1397
Personal finance

Metphoric Associates
P.O. Box 6346
Pittsburgh, PA 15212
Recreational

Micro-Ap, Inc.
7033 Village Pkwy., Suite 206
Dublin, CA 94566
(415) 828-6697
DBMS

Micro Architect, Inc.
96 Dothan St.
Arlington, MA 02174
Business, DBMS, word processing

Micro Business Software, Inc.
Dover Rd., Willow Hill Bldg.
Chichester, NH 03263
(603) 798-5700

Micro Business Solutions, Inc.
622 Plymouth Lane, Suite 100
Foster City, CA 94404
(415) 573-5556
Business

Microcom
89 State St.
Boston, MA 02109
(617) 367-6362
Business, utilities

MicroCompatible
151 6th St.
P.O. Box 7624
Atlanta, GA 30357
(404) 874-8366
Utilities

Micro-Computer Sales
P.O. Box 53376
Fayetteville, NC 28305
(919) 483-2003
Business

Microcomputer Software Associates
1122 B. St.
Hayward, CA 94541
(415) 534-2212
Utilities

Microcomputing Research
29 Estancia
Marana, AZ 85238
Personal finance

Micro Craft Systems, Inc.
188 Kerby Rd.
Grosse Pointe Farms, MI 48236
(313) 996-1297
Utilities, systems

MicroGnome
5843 Montgomery Rd.
Elkridge, MD 21227
(301) 796-2456
Educational

Micro Ink, Inc.
34 Chelmsford St.
P.O. Box 6502
Chelmsford, MA 01824
(800) 227-1617; in CA (800) 772-3545

MicroLab
2310 Skokie Valley Rd.
Highland Park, IL 60035
(312) 433-7550
Recreational, DBMS, personal finance

Micro Learningware
P.O. Box 2134
N. Mankato, NM 56001
(507) 625-2205
Educational

Micromatic Programming Co.
P.O. Box 158
Georgetown, CT 06829
(203) 324-3009
Personal finance

Micromation
Yorkdale Pl.
1 Yorkdale Rd., Suite 406
Toronto, Ontario
Canada M6A 3A1
(416) 781-6675
Word processing

Micro-Media
P.O. Box 538
Linden, MI 48451
Utilities

Microphys Programs
2048 Ford St.
Brooklyn, NY 11229
(212) 646-0140
Educational

Micro Power & Light Co.
12820 Hillcrest Rd. #224
Dallas, TX 75230
(214) 239-6620
Educational

Micro Print-X Inc.
P.O. Box 581
Ballinger, TX 76821
(915) 365-2343
Word processing

MicroPro International
1299 Fourth St.
San Rafael, CA 94901
(415) 457-8990
Business, word processing

Micro Resources Corp.
6922 Harding Rd.
Suite 117B
Nashville, TN 37221
Systems

Micro Serve Inc.
276 5th Ave.
New York, NY 10001
(212) 683-2811
Business

Microsoft Consumer Products
10700 Northup Way
Bellevue, WA 98004
(206) 828-8080
Recreational, educational, systems, business

Micro-Sparc, Inc.
P.O. Box 325
Lincoln, MA 01773
(617) 259-9710
Utilities, word processing

Micro Systems Software
3235 Kifer Rd., Suite 32
Santa Clara, CA 95051
(408) 735-1650
Utilities

Micro-Tech Associates
2305 Appleby Court
Wheaton, IL 60187
(312) 462-9108
Business

Micro-Ware Dist. Inc.
P.O. Box 113
Pompton Plains, NJ 07444
Recreational, utilities

Micro Works
P.O. Box 1110
Del Mar, CA 92014
(714) 942-2400
Utilities

Miller Microcomputer Services
61 Lake Shore Rd.
Natick, MA 01760
(617) 653-6136
Utilities

Milliken Publishing Co.
Computer Department
1100 Research Blvd.
St. Louis, MO 63132
(314) 991-4220
Educational

Milton Bradley
443 Shaker Rd.
East Longmeadow, MA 01028
(413) 525-6411, ext. 2334
Educational

Mint Software
6422 Peggy St.
Baton Rouge, LA 70808
(504) 766-2318
Utilities

Misosys
5904 Edgehill Dr.
Alexandria, VA 22303
(703) 960-2998
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Modular Media
11060 Paradela St.
Miami, FL 33156
(305) 661-7310
Utilities

Monoson Microsystems, Inc.
51 Main St.
Watertown, MA 02172
(617) 924-2124
Business

Monument Computer Service
Village Data Center
P.O. Box 603
Joshua Tree, CA 92252
(800) 854-0561; in CA (800) 432-7257, ext. 802
Educational, business, personal finance

Mumford Micro Systems
P.O. Box 400
Summerland, CA 93067
(805) 969-4557
Utilities, systems

Muse Software
347 N. Charles St.
Baltimore, MD 21201
(301) 659-7212
Recreational, educational, utilities, word processing

National Software Marketing
4701 McKinley St.
Hollywood, FL 33021
(305) 625-6062
Educational

NEC Home Electronics USA
Personal Computer Division
1401 Estes Ave.
Elk Grove Village, IL 60007
Business, word processing

Nelson Software Systems
P.O. Box 19096
Minneapolis, MN 55419
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Nova Technology
P.O. Box 688
Clearlake, CA 95422
(707) 994-4649
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P.O. Box 490
Lilburn, GA 30247
(404) 469-0056
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OCO, Inc.
1001 J Bridgeway, Suite 128
Sausalito, CA 94965
(415) 331-1000
Personal finance

Omega Software Products Inc.
222 South Riverside Plaza
Chicago, IL 60606
(312) 648-1944
Utilities

Omni Microware, Inc.
222 S. Riverside Plaza
Chicago, IL 60606
(312) 648-1944
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Omni Software Systems Inc.
146 N. Broad St.
Griffith, IN 46319
(219) 924-3522
Business

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36575 Mudge Ranch Rd.
Coarsegold, CA 93614
(209) 683-6858
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Omikron
1127 Hearst Ave.
Berkeley, CA 94702
(415) 845-8013
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Oppenheimer Software
79th Street Boat Basin #39
New York, NY 10024
(212) 787-2416
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8950 Lurline Ave.
Chatsworth, CA 91311
(213) 341-2535

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10379 Lansdale Ave.
Cupertino, CA 95014
(408) 446-3099
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Options-80
P.O. Box 471
Concord, MA 01742
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Orion Software
147 Main St.
Ossining, NY 10562
(914) 762-5636
Recreational, utilities

Osborne/McGraw-Hill
630 Bancroft Way
Berkeley, CA 94710
(415) 548-2805
Personal finance

PBL Corporation
605 Harmony Cr. Dr.
Wayzata, MN 55391
(612) 473-3769
Personal finance, utilities

PCD Systems
P.O. Box 143, Penn Yan
New York, NY 14527
(315) 536-3734
Home, educational

Passport Designs, Inc.
785 Main St., Suite E
Half Moon Bay, CA 94019
(415) 726-0280
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Pear Systems Corp.
27 Briar Brae Rd.
Stamford, CT 06903
Personal finance

Peggytronics
381 First St.
Los Altos, CA 94022
(408) 737-2253
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Penguin Software
1206 Kings Circle
West Chicago, IL 60185
(312) 231-0912
Utilities

Persasoft, Inc.
9609 SW Kelly
Portland, OR 97219
(503) 244-8239

Personal Software
(See VisiCorp)

Phase One Systems, Inc.
7700 Edgewater Dr., Suite 830
Oakland, CA 94621
Systems, utilities

Phoenix Software, Inc.
64 Lake Zurich Dr.
Lake Zurich, IL 60047
(312) 438-4850
Utilities

Piccadilly Software
89 Summit Ave.
Summit, NJ 07901
(201) 227-1020
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Pickles & Trout
P.O. Box 1206
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(805) 685-4641
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Lauderhill, FL 33313
(305) 739-2071
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Chicago, IL 60648
(312) 647-0988
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Powersoft Inc.
P.O. Box 157
Pitman, NJ 08071
(609) 589-5500
Utilities, business, educational,
recreational

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Toms River, NJ 08753
Home

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Refugio, TX 78377
(512) 526-4758
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Englewood Cliffs, NJ 07632
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Minneapolis, MN 55422
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Needham, MA 02194
(617) 444-5224
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180 Franklin St.
Cambridge, MA 02139
(617) 497-2077
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11 Idar Court
Greenwich, CT 06830
(203) 661-8799
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P.O. Box 954
New Milford, CT 06776
(203) 355-3452
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257 Central Park West
New York, NY 10024
(212) 787-1526
Business, educational

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4200 Wisconsin Ave. N.W.
Washington, DC 20016
(800) 424-2738; (202) 363-9797

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Suite 323, Blue Bell West
Blue Bell, PA 19422
(215) 279-4438
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N. Hollywood, CA 91603
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9719 Reseda Blvd.
Northridge, CA 91324
(213) 349-5560
Recreational, utilities

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Baltimore, MD 21214
(301) 426-6812
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High School Division
2970 Brandywine Rd.
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(213) 947-2762
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Euclid, OH 44119
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13340 Kit, Suite A-5
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(214) 369-0415

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(201) 947-6104
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(303) 989-3730
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